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Major Charles C. Floyd, U.S. Air Force

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U.S. AIR FORCE AND U.S. NAVY JOINT PILOT TRAINING: AN ANALYSIS OF THE FIGHTER TRAINING TRACKS

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

CHARLES C. FLOYD, MAJ, USAF
B.S., United States Air Force Academy, Colorado, 1982

Fort Leavenworth, Kansas
1996

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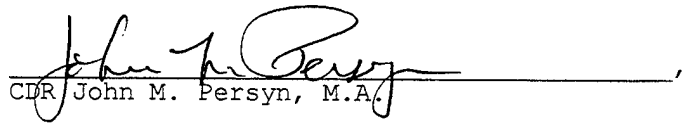

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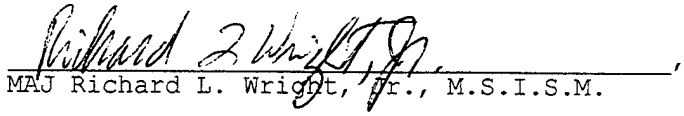

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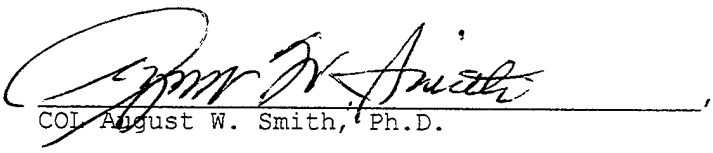

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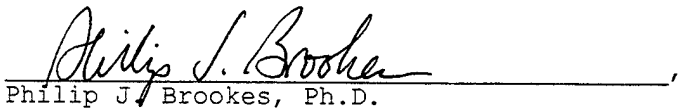

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

U.S. AIR FORCE AND U.S. NAVY FIGHTER JOINT PILOT TRAINING: AN ANALYSIS OF THE FIGHTER TRAINING TRACKS by Major Charles C. Floyd, USAF, 93 pages.

This study investigates the feasibility of consolidating the Air Force Fighter-Bomber and the Navy Fighter-Attack pilot training tracks. Excluding Navy Carrier Qualification training, the core training in these two undergraduate fighter training tracks is similar. The instruction in fighter-related training areas is also similar in nature, but different training philosophies have reduced the compatibility for consolidating the two fighter training tracks.

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This study concludes that near-term consolidation is unlikely. However, long-term consolidation is feasible but requires immediate studying if it is to occur. The study promotes further research to consolidate the training conducted in the two fighter training tracks into a Joint Advanced Phase Fighter track.

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This has been a most enlightening experience and it could not have been accomplished with out the help and support of many individuals. First, I wish to thank my understanding wife, Lisa, for her support and patience. Second, my three-year-old daughter Mary Mitchell does not understand the meaning of this project and continuously asks why I must do so much homework. Third, I would like to thank my committee members and the Department of Graduate Degree Programs office for their time, inputs, and keeping me honest during my research and writing. And finally, thanks to the Combined Arms Research Library reference and research staff on the first and third floors for their assistance in the conduct of my research.

PREFACE

My interest in Joint Pilot Training began during a previous assignment at Columbus Air Force Base, Mississippi. While at this Air Education and Training Command (AETC) base, I was an Instructor Pilot (IP) in the AT-38, the Chief of Training in the 49th Flying Training Squadron (Introduction to Fighter Fundamentals), and the Current Operations Flight Commander in the 14th Operations Support Squadron. In these capacities I learned of the possibilities of Joint Pilot Training with the U.S. Navy. Most of these were philosophical what ifs at the AETC staff level, but they did stir my interests.

In addition to my interests in this area, I have acquired some experience with both services. In the Air Force I have over 1550 hours in the F-111A/D/E/F fighter aircraft, including Fighter Training Unit (FTU) IP duties, squadron IP duties, and Numbered Air Force Flight Examiner duties. In AETC, I had a short tour as an AT-38B Squadron IP (250 hours). My Naval experience consists of being an exchange pilot flying the A-6E/KA-6D Intruder. I flew nearly 800 hours during my exchange tour which included two sea cruises and 172 (50 night) carrier arrestments. This by no means makes me an expert on Joint Pilot Training, but I do feel it provides me with the necessary background to objectively research and address this subject.

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LIST OF ABBREVIATIONS

ACC	Air Combat Command
ACM	Air Combat Maneuvers
AETC	Air Education and Training Command
AFB	Air Force Base
AHC	Advanced Handling Characteristics
AOA	Angle-of-Attack
ATC	Air Training Command
BFM	Basic Fighter Maneuvers
BRAC	Base Realignment and Closure Committee
CARL	Combined Arms Research Library
CBO	Congressional Budget Office
CNATRA	Chief of Naval Air Training Command
CNO	Chief of Naval Operations
DOD	Department of Defense
ENJJPT	Euro-NATO Joint Jet Pilot Training
FAA	Federal Airways Administration
FAM	Familiarization
FCLP	Field Carrier Landing Practice
FLOLS	Fresnel Lens Optical Landing System
FORM	Formation
FRS	Fleet Replacement Training Squadron
FTU	Fighter Training Unit
FY	Fiscal Year
IFF	Introduction to Fighter Fundamentals
IFR	Instrument Flight Rules

IFT	Instrument Flight Trainer
INST	Instrument
IP	Instructor Pilot
JPATS	Joint Primary Aircraft Training System
MOU	Memorandum of Understanding
NAS	Naval Air Station
NATO	North Atlantic Treaty Organization
NATOPS	Naval Aviation Training Operations Procedures and Standardization
NAV	Navigation
OCF	Out-of-Control Flight
OFT	Operational Flight Trainer
OP	Operational
OPR	Office of Primary Responsibility
PAPI	Precision Approach Path Indicator
Qual	Qualification
RMS	Resource Management System
SNA	Student Naval Aviator
SUNT	Specialized Undergraduate Navigator Training
SUPT	Specialized Undergraduate Pilot Training
TACAIR	Tactical Aviation (Naval)
TARF	Trainer-Attack-Reconnaissance-Fighter
TTB	Tanker-Transport-Bomber
UFT	Undergraduate Flying Training
UPT	Undergraduate Pilot Training
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules

CHAPTER 1

INTRODUCTION

> We have got to be of one family, and it is more important today than it ever has been.
>
> Dwight D. Eisenhower, Speech to the National War College, 1950

General of the Army Dwight D. Eisenhower's comment to the National War College is even more important today than when he said it in 1950. As bold print in the frontispiece of the current Joint Pub 1, his statement highlights the importance of jointness in the United States military.[1] Today, United States military operations increasingly emphasize joint and combined operations. Joint emphasis prior to the drawdown of US military forces in the 1990s focused on increasing military combat power and capability. During the drawdown, jointness included more than just increasing combat power. It also emphasized increasing service standardization and interoperability and decreasing redundancy. Therefore, jointness should create a more efficient and effective military force.

To increase jointness in the United States' military force, the services have had to release cherished service parochial reins. Consolidating joint operations generally requires one or more of the services to relinquish some authority to another. At times, this can be perceived as a threat to a service's existence; therefore, jointness can also be a double-edged sword. This thesis will focus on one of the many aspects of increasing joint consolidation: Joint Pilot Training.

Problem Statement

The 1986 Goldwaters-Nichols Department of Defense Reorganization Act directed the uniformed services to increase joint cooperation. In his 1993 Roles, Missions, and Functions of the Armed Services report, the Chairman of the Joint Chiefs of Staff recommended consolidating initial fixed-winged pilot training and transitioning such training to a common primary trainer aircraft.[2] Later that year, the Air Force and the Navy implemented a Joint Pilot Training program for the Primary and Tanker-Transport-Maritime Patrol training phases.[3] Air Force Fighter-Bomber and Navy Fighter-Attack training remain service unique training programs and future pursuit for jointness in these two areas is unlikely.

Research Question

This thesis investigates the reason or reasons why there are two separate training tracks to produce fighter pilots from Air Force and Navy pilot training programs. The research question for this thesis is: Can Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks be consolidated? If the answer is a conditional yes, then the thesis will address the possible conditions or various levels of consolidation that may be feasible.

Supporting Questions

There are five supporting questions in this thesis. First, What phase of Joint Pilot Training implementation is the Air Force and Navy currently reviewing? This question addresses the issues of current and future plans in the Joint Pilot Training program. This may also provide more insight into the cultural and training philosophies of the two services.

Second, Is the training in the Fighter-Bomber and Fighter-Attack training tracks compatible for consolidation? This requires a comparative analysis and then an evaluative analysis of the present fighter and strike pilot training programs. This study attempts to provide as many advantages and disadvantages as possible to present the feasibility of joint fighter pilot training.

Third, How would consolidation of the fighter tracks benefit each service? This relates to the second question as it applies to the advantages of consolidating future training. Advantages may not only include increased jointness, but may also improve training efficiency and decrease requirements for training assets.

Fourth, What barriers may have to be overcome to facilitate joint fighter pilot training? This may prove to be an extremely sensitive subject. Each service has been training pilots independently for nearly eighty years.[4] The services also believe their service-oriented training programs produce fliers of the highest caliber. Both fighter and strike-fighter pilots take great pride in themselves and their livelihoods. Adopting or being subjected to another service's training method may not be willingly received, especially on such a grand scale.

Finally, the fifth question, Do the Air Force and Navy consider joint fighter pilot training compatible? Service attitudes on the advantages, disadvantages, and the barriers to joint fighter and strike pilot training are addressed in this section. These, plus service parochialisms, will have to be resolved in order for joint fighter pilot training to occur.

Significance of the Study

This thesis addresses a very sensitive and parochial subject. The military services are not likely to volunteer to relinquish any

portion of control in the fundamental core training of their own servicemembers, particularly pilot training. Secretary of Defense Les Aspin directed the Air Force and Navy to consolidate and combine flight training into four common pipelines in accordance with the recommendations by General Colin Powell, Chairman of the Joint Chiefs of Staff.[5] Shortly thereafter, the Primary Phase of fixed-wing pilot training became a joint reality. This initial step by the Air Force and the Navy has led to additional consolidation in Air Force and Navy flight training. The present Joint Flight Training program appears to be joint in nature; however, the level of jointness and consolidation may be questionable. If additional training in the fighter training tracks can be consolidated, then the Department of Defense may be able to allocate its diminishing resources to other training or operational needs.

Background

Air Force and Navy pilot candidates begin formal flight training in the Primary Phase, now called the Joint Primary Phase. Air Force students start flight training in the T-3A Firefly as part of a prescreening phase before Joint Primary Phase begins. There is no specific, dedicated prescreening phase in the Navy system. In the Navy, this is considered part of the Joint Primary Phase's mission. The basics of flight and aircraft operations and procedures are taught during the Joint Primary Phase. The methods of instruction may vary, but the flying skills and the basic procedures remain the same.

After the Joint Primary Phase, students continue on to the Advanced Phase. The Advanced Phase consists of four tracks or pipelines outlined by the recommendations of the Chairman of the Joint Chiefs of Staff. During the Advanced Phase, students learn advanced skills to prepare them for their follow-on aircraft assignments. Instruction

focuses upon improving the basics and introducing additional specialized training. The Advanced Phase's Helicopter track trains students only in rotary-wing aircraft and is currently under review by the Department of Defense. The Tanker-Transport-Maritime Patrol track is being reviewed and implemented to increase joint training.[6] Only the Fighter-Bomber and Fighter-Attack tracks remain service unique programs.

The Advanced Phase Fighter-Bomber and Fighter-Attack tracks conduct normal and fighter specific training. The fighter specific training is required prior to reporting for follow-on weapons system (F-15, F-14, etc.) training and includes air-to-air combat, weapons delivery, and aircraft carrier operations training. Air Force fighter pilot candidates receive air-to-air combat and weapons delivery training after graduating from pilot training and before proceeding to Fighter Training Units (FTUs). Navy fighter and strike-fighter pilot candidates complete all phases of training, including aircraft carrier qualification, prior to graduation and follow-on training at the Fleet Replacement Squadrons (FRSs).

The Air Force Advanced Phase trains future fighter pilots under two different training curricula. This training change resulted in providing the gaining commands with better trained first assignment pilots. The former curriculum of the Air Force Advanced Phase, Undergraduate Pilot Training (UPT), is only instructed at Columbus Air Force Base (AFB), Mississippi, and it should transition to the new curriculum starting in mid-1996. The new curriculum, Specialized Undergraduate Pilot Training (SUPT), is currently instructed at Vance AFB, Oklahoma, Reese AFB, Texas, (being considered by the 1995 Base Realignment And Closure (BRAC) commission for closure), and Laughlin AFB, Texas. Two other Air Force pilot training bases also train students: Sheppard AFB, Texas, and Randolph AFB, Texas. Sheppard AFB

operates a different training program and is addressed later in this chapter. Randolph AFB is the core location for training instructor pilots (IPs) in the T-37B, T-38A, AT-38B, and T-1A aircraft. Both SUPT and UPT train Air Force Fighter-Bomber students in the T-38A Talon.

After graduating and receiving their wings from the Advanced Phase, Air Force Fighter-Bomber track graduates, slated for fighter aircraft, receive follow-on training in the Introduction to Fighter Fundamentals (IFF) phase. This short course introduces fledgling fighter pilots to fighter fundamentals. It also acts as a transition for the former student pilots to the demanding world of being fighter pilots. Students fly a modified T-38 aircraft, called the AT-38B, during IFF. IFF is primarily instructed at Columbus AFB, but Randolph AFB and Sheppard AFB also provide instruction to a limited number of IFF students.

Like the Air Force, the Navy is also transitioning to a new Advanced Phase Fighter-Attack pilot training curriculum. The Navy's change is due to transitioning to a new trainer aircraft, not due to a change in course training philosophy.

After completing the Joint Primary phase, those Student Naval Aviators (SNAs) going on to strike aviation proceed through the Advanced Phase at either Naval Air Station (NAS) Meridian, Mississippi (being considered by the 1995 BRAC commission for closure), or at NAS Kingsville, Texas. NAS Meridian provides Intermediate Strike Training in the T-2C Buckeye jet aircraft and Advanced Strike Training in the TA-4J Skyhawk jet aircraft. NAS Kingsville has transitioned from the T-2C and TA-4J to the new T-45A Goshawk jet aircraft for Strike Flight Training. Both curricula train SNAs for the same tasks, requirements, and qualifications, except that the T-45TS (Training System) curriculum consolidates the T-2C and TA-4J syllabi into one.

Following the guidance issued in the Joint Fixed-Wing Training Plan, IPs from both services have been participating in an instructor exchange program.[7] These IPs are instructing in each services Primary Phase of pilot training to increase their "joint" training knowledge and to help define and restructure possible future joint pilot training programs. Currently, only one squadron from each service is being used as a test squadron, the 35th Flying Training Squadron (flying the T-37B) at Reese AFB, Texas, and Training Squadron THREE (flying the T-34C) at NAS Whiting Field, Florida.[8]

Scope and Limitations

This thesis only addresses Air Force and Navy fixed-wing pilot training. More specifically, this thesis examines only the Air Force Fighter-Bomber and Navy Fighter-Attack tracks. Although the focus of this study is on the fighter training tracks, the Joint Primary Phase of Joint Pilot Training program is also addressed. This establishes the core elements for the follow-on Advanced Phase of training.

The U.S. trains many foreign nationals in both the Air Force and Navy pilot training programs. Both services use U.S. IPs and U.S. training criteria and standards to train most foreign students.[9] These programs are not joint operations and are not used for this study.

The U.S. Air Force and NATO allies operate a unique pilot training program at Sheppard AFB, Texas. Euro-NATO Joint Jet Pilot Training (ENJJPT) is a pilot training program that is a mixture of U.S. Air Force and NATO IPs operating under a NATO training syllabus and standard. ENJJPT training is accomplished in the same T-37B and T-38A trainers as are used in Air Force UPT and SUPT. ENJJPT students receive more flight training and flight time than their equivalent Air Force student pilots. Also, ENJJPT falls under a different command relationship than contemporary Air Force pilot training squadrons. On

casual observation, ENJJPT appears to have the makings of a combined program, but it is essentially an expanded Air Force pilot training program that includes many NATO students and instructors. Therefore, ENJJPT is not addressed in this thesis.

Although other nations have the ability to conduct aircraft carrier operations (the United Kingdom, France, Russia, Argentina, Spain, Italy, and several others), only a few of these nations (France, Russia, and Argentina) employ catapult launch systems similar to those used by the U.S. Navy. These nations either have small carrier forces and Naval air forces or do not have operational aircraft carriers at this time. Therefore, this study limits its focus and research to the training programs in the U.S. Armed Forces.

For the purpose of this thesis, three assumptions are made. First, the Air Force and Navy pilot training programs have equivalent graduation standards. That is, both services graduate equally qualified pilots who are capable of completing service-required follow-on fighter and strike-fighter training. Second, the Air Force and Navy have equivalent instructional standards in all phases of pilot training. Training philosophies may vary, but the level of academic, ground, simulator, and flight instruction is considered equal. This study does not evaluate the quality of the different training programs.

The third assumption is the relationship between the Air Force's fighter community and the Navy's fighter and strike-fighter communities. The Air Force considers all air-to-air (F-15), air-to-ground (OA/A-10, F-111, F-117), and multi-role (F-4, F-15E, F-16) aircraft and pilots as fighters and fighter pilots. The Navy distinctly divides its aircraft and pilots into different groups. Navy air-to-air types (F-14) are called fighters and fighter pilots. Navy air-to-ground types (A-6) are called attack pilots, and Navy multi-role types (F/A-18)

are called strike-fighters. For this thesis, all references to air-to-air, air-to-ground, and multi-role aircraft and pilots will be as fighters and fighter pilots, unless directly addressing Naval assets.

Presently there is limited information in print on Joint Pilot Training and even less covering joint fighter pilot training. The current Joint Pilot Training program was implemented in 1993 and has only been operational since 1994 with the training of a few students in each of the services' Joint Primary Phases.[10] Both services are closely monitoring this phase for future planning considerations.

This study focuses on reviewing the context and sequencing of training in the Air Force and Navy fighter training tracks. With the exception of a few documents, all research for this study begins with 1993 and continues to the time of this writing.

Definitions

Advanced Strike Training. The final phase of undergraduate flight training for SNAs in the former Advanced Phase of Navy Fighter-Attack pilot training. This training is accomplished in the TA-4J.

Air Force Pilot. An Air Force officer who graduates from either Undergraduate Pilot Training or Specialized Undergraduate Pilot Training earning the Air Force pilot's "Silver Wings" (Figure 3).

Intermediate Strike Training. The phase of training that introduces SNAs to naval tactical jet aviation in the T-2C. This phase of training is also in the older Navy Advanced Phase of pilot training.

Joint. "Connotes activities, operations, organizations, etc., in which elements of more than one Service of the same nation participate. (When all Services are not involved, the participating Services shall be identified, e.g., Joint Army-Navy.)"[11]

Joint Pilot Training. A joint program that the military services and the Coast Guard use to train pilots and Naval Aviators.

After screening, if required, students enter Joint Primary Phase. Upon completion of this phase, students then transition to one of four Advanced Phase pipelines or tracks: Air Force Fighter-Bomber, Navy Fighter-Attack, Airlift-Tanker-Maritime Patrol, and Helicopter. After earning their wings, pilots and Naval Aviators then proceed to their operational assignments in the field or fleet.

Naval Aviator. A Naval or Marine officer who graduates from the Navy's pilot training program earning the Navy's "Wings of Gold" (Figure 4).

Specialized Undergraduate Pilot Training (SUPT). The new Air Force undergraduate pilot training program. It consists of prescreening in the T-3A, Joint Primary Training in the T-37B, and then specialized training in either the Fighter-Bomber track flying T-38As or the Tanker-Transport track flying the new T-1A. Those students selected for C-130 follow-on training continue flight training at NAS Corpus Christi, Texas in the T-44.

Strike Flight Training. The new Navy phase of training in the Navy Advanced Phase of Joint Pilot Training. Strike Flight Training combines the Intermediate and Advanced Strike Flight Training into one program and one aircraft, the T-45A.

Undergraduate Flying Training (UFT). The Air Force training program that includes the new Specialized Undergraduate Pilot Training and Specialized Undergraduate Navigator Training (SUNT).

Undergraduate Pilot Training (UPT). The former Air Force pilot training program which graduates universally assignable pilots. UPT consists of prescreening (T-3A), Primary Jet Training Phase (T-37B), and Advanced Jet Training (T-38A).

Summary

Chapter 1 presents a general overview for this study. The remainder of this thesis addresses the feasibility of consolidating the fighter training tracks of Air Force and Navy pilot training. Chapter 2 presents a Literature Review for the study. Chapter 3, Research Design, lays the foundation for the research and analysis of the study. The Comparative Analysis of the Fighter-Bomber and Fighter-Attack tracks is in Chapter 4. The final chapter 5, Evaluation and Conclusions, provides an evaluative analysis, conclusions, recommendations, and areas for further study.

Endnotes

[1]Dwight D. Eisenhower, General of the Army, "Command in War," speech given at the National War College, 30 October 1950, Quoted in Joint Pub 1, Joint Warfare of the US Armed Forces (Washington, D.C.: Nation Defense University Press, 11 November 1991), frontispiece.

[2]Colin L. Powell, General, U.S. Army, Chairman of the Joint Chiefs of Staff Report on the Roles, Missions, and Functions of the Armed Forces of the United States (Washington, D.C.: National Defense University Press, February 1993), 20.

[3]Ibid.

[4]Air Force lineage begins in August 1907 when the Army established an Aeronautical Division in the Signal Corps. During World War I, Army aviation became the Air Service in May 1918. In 1926 the Air Service transitioned to its own branch as the Army Air Corps. Before United States military involvement in World War II, the Army reorganized Army aviation again, forming the Army Air Forces in June 1941. Finally in July 1947, the United States Air Force is established as a separate military service. Information from Charles A. Ravenstein, The Organization and Lineage of the United States Air Force (Washington, D.C.: U.S. Government Printing Office, 1986), 1-10.

[5]Les Aspin, Secretary of Defense, "Memorandum on the Roles, Missions, and Functions of the Armed Forces of the United States" (Washington, D.C.: Office of the Secretary of Defense, 15 April 1993), Attachment, p. 2.

[6]Powell, 18-19.

[7]Michael B. Donley, Acting Secretary of the Air Force, and Frank B. Kelso, Acting Secretary of the Navy, "Memorandum on Joint Fixed-Wing Training" (Washington, D.C.: Offices of the Secretary of the Air Force and Secretary of the Navy, 9 July 1993), Attachment, p. 21.

[8]"Point Paper on Consolidated Undergraduate Flying Training, Jun 1993 to Oct 1995," Staff Working Papers (Washington, D.C.: Department of the Air Force, no date), 2.

[9]The Air Force and Navy train many foreign student pilots each year. These students accomplish the same training as their US counterparts and if required, they may receive additional training sorties in order to meet training standards. As an example, Columbus AFB, Mississippi, trains Italian, Turk, Japanese, and other foreign nationals in Air Force pilot training. Foreign students, such as Italian naval officers, also train at various Navy pilot training bases.

[10]Donley and Kelso, 13.

[11]Joint Staff, Joint Pub 1-02, The DOD Dictionary of Military and Associated Terms (Washington, D.C.: U.S. Government Printing Office, 23 March 1994), 199.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the available literature concerning the feasibility of consolidating the Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks. Since the Goldwaters-Nichols Act in 1986, joint military operations have been routine events, but joint Air Force and Navy pilot training has only been a reality since 1993. Due to the infancy of Joint Pilot Training, the scope of the research only encompasses material from 1989 to the present. Pre-1993 material provides background information on the feasibility of consolidating aspects of Air Force and Navy pilot training. Material from 1993 and afterwards represents the current state of affairs in the consolidation of the two pilot training programs.

Sources on Joint Pilot Training are not readily available. Few sources outside of the Department of Defense actually address the issue of consolidating pilot training. Of the material reviewed, even less was written on consolidating the two fighter training tracks. The research gathered for this thesis is divided into the following areas: research project, government and Department of Defense (DOD) documents, service publications, Memorandum of Understanding (MOU), staff working papers, and telephone interviews.

Research Project

The research for this study begins with a 1989 individual study paper from the Naval War College, "Joint USN/USAF Pilot Training: An Operational Concept." The author was an Air Force Lieutenant Colonel

who was an IP and a staff officer in Air and Education Training Command (AETC) and who had dealt with AETC training issues. His work stimulated some additional ideas and areas to research. He presented a broad look at potential pilot training consolidation areas in 1989, which occurred during the conceptual phase of joint pilot training. The conclusions of his paper revealed that consolidation is feasible, mainly in the Primary Phase, and that consolidation of advanced stages would be difficult due to service training requirements.[1]

Government and Department of Defense (DOD) Documents

On 10 February 1993, General Colin Powell released his Chairman of the Joint Chiefs of Staff Report on the Roles, Missions, and Functions of the Armed Forces of the United States. This report outlined his views and recommendations for improvement in the armed forces of the United States, including Joint Pilot Training issues. General Powell recommended that the Air Force, Coast Guard, Marine Corps, and Navy consolidate initial fixed wing training.[2] Additionally, the services would consolidate follow-on pilot training into four training tracks: Air Force Fighter-Bomber, Air Force and Navy Tanker-Transport-Maritime Patrol, Navy Fighter-Attack, and Helicopter training tracks.[3] These recommendations formed the foundation for the Joint Pilot Training program.

Following General Powell's recommendations on flight training, Secretary of Defense Les Aspin promptly implemented those recommendations. In his 15 April 1993 "Memorandum on the Roles, Missions, and Functions of the Armed Forces of the United States," he directed the Secretary of the Air Force, with the assistance of the Secretary of the Navy, to consolidate initial fixed wing training and to combine follow-on training into the same four tracks.[4] Initial or Primary Flight Training then became the cornerstone for joint training.

However, the fighter tracks remained service unique training and the Secretary did not provide further guidance to continue investigating the possibilities to consolidate these two tracks. The Secretary did direct that the services exchange IPs in fiscal year (FY) 1993 followed by joint student training in FY94.[5]

In response to Mr. Aspin's memorandum, the Secretaries of the Air Force and Navy formulated and signed on 15 July 1993 a Joint Fixed-Wing Training Plan. The services would work together to consolidate future Tanker-Transport-Maritime Patrol Advanced pilot training and other navigator related career fields.[6] Other joint training initiatives were addressed, but the pursuit of consolidation in the fighter training tracks was not addressed.

In July 1994, the Congressional Budget Office (CBO) released a report, titled "Easing the Burden: Restructuring and Consolidating Defense Support Activities." Chapter V of this report dealt with consolidating pilot training. The CBO reviewed the recommendations by General Powell and the service plans to implement consolidated pilot training. The CBO considered the crossflow of IPs and students into one Air Force and one Navy primary training squadron by 1998 as only an exchange, not a consolidation.[7] Since there was no requirement to consolidate fighter tracks, the CBO report did not address this issue.

Later that fall, the Deputy Secretary of Defense John White delivered a "Memorandum on Consolidation of Fixed-Wing Flight Training." This 24 October 1994 memorandum again addressed the Chairman's recommendation of four follow-on training tracks. The attached charts to his memorandum addressed the initiatives to increase joint flight training in navigator career fields and the current joint fixed-wing pilot training. In his last paragraph, the Deputy Secretary of Defense states:

> I am encouraged by the cooperation and progress we have made in bringing jointness to flight training and hope that it serves as a model in other areas where the Department might benefit from increasing "jointness."[8]

This statement confirms that the Air Force and Navy are working together to increase jointness, but the remainder of the memorandum does not requires the Air Force and Navy to pursue further investigation into consolidating their fighter training tracks.

The final DOD publication reviewed for this study was an article in the Spring 1995 issue of Joint Force Quarterly. In his article "The Joint Challenge to Interservice Training," U.S. Air Force General Henry Viccellio, Jr., then Commander of AETC, addressed many aspects of joint training, from law enforcement to flight training. Figure 1 below is from the article and displays the current flow of Joint Pilot Training from the start of pilot training through completion to operational field and fleet assignments.

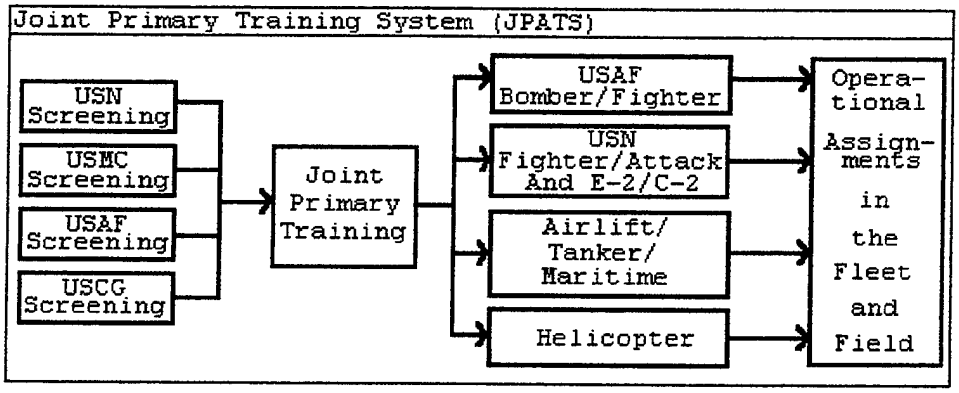

Figure 1. Joint Pilot Training Flow. Reprinted from, Henry Viccellio, Jr., General, U.S. Air Force, "The Joint Challenge to Interservice Training," Joint Force Quarterly 7 (Spring 1995): 47.

As in the previously reviewed publications, General Viccellio hailed the progress in the current Joint Pilot Training program. Again, the

Fighter-Bomber and Fighter-Attack tracks were not specifically addressed as the were the other joint flight programs.

General Viccellio also states in his article:

> With our counterparts in other services, the Air Education and Training Command has a full plate in providing the best possible trained and educated soldiers, marines, and airmen. The services must share their unique capabilities in order to foster joint culture.[9]

General Viccellio's statement echo many others in emphasizing Joint Pilot Training and also like the other reviewed documents and publications, this jointness does not seem to include the Fighter-Bomber and Fighter-Attack training tracks.

Service Publications

To maintain a standardized pilot training program for the geographically separated training bases, the Air Force and Navy have developed training syllabi and curricula for each of the various training phases and tracks. The Air Force and Navy are transitioning to new fighter tracks; therefore, each service is currently conducting instruction in two types of advanced training. The Air Force's transition is due to a change in training philosophy and is nearly complete with the transition from UPT to SUPT. The Navy's transition is due to the purchase of the T-45 trainer aircraft and that transition will be complete when the total buy has been accomplished. Both curricula in each of the services' fighter training tracks are addressed in this chapter.

Air Force

UPT is the former Air Force pilot training program and is only operational at Columbus AFB. Phase III, T-38 Undergraduate Pilot Training, trains in the T-38A (Figure 5) and graduates a universally assignable pilot, i.e., the graduate can be selected for follow-on

training as a fighter pilot, transport pilot, tanker pilot, or bomber pilot. UPT Phase III training does not differentiate student pilot training until four-to-six weeks prior to graduation. Student pilots are then selected, on merit, to continue Phase III training in Resource Management System (RMS) 1 Trainer-Attack-Reconnaissance-Fighter (TARF), or in RMS 2 Tanker-Transport-Bomber (TTB).

Even after this selection, the training is essentially the same; only the sortie allocation changes. The difference, six sorties out of a total of eighty-six, is split between the Formation, Instrument, and Navigation phases. The TARF qualified student pilots get additional training in three and four-ship formation operations and formation navigation training.[10] The TTB student pilots have additional training that focuses on improving instrument approach procedures[11] and visual flight rules (VFR) operations.[12] UPT RMS 1 (TARF) aircraft flight sortie allocations are as follows:

Table 1.--UPT T-38 RMS 1 Training Syllabus Sorties/Hours per Phase

Phase	Simulator	RMS 1	
		Dual	Solo
Basic	2/ 2.6	-	-
Contact	4/ 5.2	20/24.0	10/11.8
Instrument	15/19.5	9/12.0	-
Formation	-	24/31.4	10/12.7
Navigation	1/ 1.3	11/14.3	2/ 2.8
Subtotal	-	64/81.7	22/27.3
TOTAL	22/28.6	86/109.0	

Source: U.S. Air Force, T-38 Undergraduate Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.

Total time required to complete this phase of training is 120 training days or approximately 24 weeks.[13] The UPT IPs have various career backgrounds and are permitted to fly with any type student,

whether RMS 1 or RMS 2. This is a continuation of the universal pilot philosophy.

All phases of pilot training require a combination of academic, simulator, and aircraft flight training. Academics prepare student pilots for upcoming simulators and aircraft flights, as well as for career development. Simulator training reinforces the previously instructed academics and also prepares students for upcoming aircraft flight training.

The new Air Force Advanced Phase is SUPT which has two tracks, Fighter-Bomber and Joint Tanker-Transport-Maritime Patrol. The Fighter-Bomber track is for those student pilots that were selected after the Primary Phase to fly either a fighter-type aircraft or a bomber-type aircraft. SUPT includes bombers in this track due to the technological advances in aviation and the handling characteristics of current Air Force bombers are more closely related to fighter-type aircraft than to "heavy" type aircraft. Table 2 lists SUPT's T-38 training allocations:

Table 2.--SUPT T-38 Training Syllabus Sorties/Hours per Phase

Phase	Simulator	T-38	
		Dual	Solo
Basic	2/ 2.6	-	-
Contact	4/ 5.2	22/26.4	6/ 7.1
Instrument	15/19.5	12/16.2	-
Formation	-	26/32.7	9/11.2
Navigation	1/ 1.3	19/22.5	2/ 2.6
Subtotal	-	79/97.8	17/20.9
TOTAL	22/28.6	96/118.7	

Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.

The new Specialized Undergraduate T-38 Pilot Training syllabus is designed to better prepare future fighter and bomber pilots for their

follow-on training. The syllabus is a little more robust than UPT Phase III training with the addition of ten more sorties in the program. Even with the additional sorties, required training time for the phase is still only one hundred twenty training days.[14]

SUPT academic training is the same as UPT's with the addition of Centrifuge Training, Aircraft Mishap Prevention, and Advanced Formation academics. Simulator training also remains unchanged. Unlike UPT, SUPT Fighter-Bomber IPs are predominately fighter pilots. The remainder can be tanker, transport, or bomber pilots.

TARF qualified UPT graduates and SUPT Fighter-Bomber graduates that have fighter aircraft follow-on training assignments continue to their next phase of training, IFF. These pilots transition to a phase of training to prepare them for their fighter training and fighter aircraft. IFF IPs are all former fighter pilots and the IFF squadron or flight is run like a normal Fighter Squadron. Even though IFF is still part of AETC, the underlying mission is to transition the former student pilot into a confident and thinking fighter pilot. Primarily, IFF introduces fighter fundamentals to those future fighter pilots.

The IFF training syllabus is Introduction to Fighter Fundamentals. The AT-38B aircraft (Figure 6) used in IFF is a modified T-38 with a basic gun sight, bomb suspension pylon, increased structural integrity, and a blue camouflage paint scheme. The aircraft and the training environment adds to the transition from student pilot to fighter pilot. The syllabus is programmed for thirty-six training days, approximately seven weeks, and has five phases: Advanced Handling Characteristics (AHC), Formation, Basic Fighter Maneuvers (BFM), Surface Attack, and Low Level Tactical Formation/Navigation.[15] The course has three specialized pilot training tracks based upon the follow-on aircraft assignment:

1. Track A--Follow-on training in the F-15A/C or F-16A/D (air-to-air mission).

2. Track B--Follow-on training in the F-16A/C or F-15E (dual-role mission).

3. Track C--Follow-on training in the F-117, (O)A-10, or (R)F-4 (air-to-ground mission).[16]

These IFF tracks tailor the training to maximize the instruction the pilots receive and to better prepare them for their follow-on fighter training. All IFF tracks, with the exception of the B Track, provide eighteen training sorties. The dual-role mission B track pilots receive an additional sortie to better prepare them for FTU training. All IFF training sorties are flown dual; therefore, there are no solo sorties for the pilots to fly. The IFF training syllabus is as follows:

Table 3.--IFF AT-38 Training Syllabus Sorties/Hours per Phase and Track

Phase	A Track	B Track	C Track
AHC	1/ 1.0	1/ 1.0	1/ 1.0
Formation	4/ 4.4	4/ 4.4	4/ 4.4
BFM	13/11.7	9/ 8.1	6/ 5.4
Surface Attack	-	4/ 3.6	4/ 3.6
Low Level	-	1/ 1.0	3/ 3.0
TOTAL	18/17.1	19/18.1	18/17.4

Source: U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1995), 1-2.

During the FY96 Posture Hearings, Secretary of the Air Force Dr. Sheila E. Widnall and Chief of Staff General Ronald R. Fogleman addressed a variety of Air Force topics, including Joint Flight Training. These remarks are presented in the 1995 Air Force Issues Book. Their statements focus on fielding, along with the Navy, the Joint Primary Aircraft Training System (JPATS). They did not discuss

actual flight training programs during their brief statements on Joint Flight Training issues; however, they did remark that JPATS was important to the Air Force: "We need this program to improve our training capabilities and save taxpayers' money."[17]

Navy

The review of Naval service publications begins with a September-October 1994 issue of Naval Aviation News. The Naval Historical Center publishes this bi-monthly periodical on Naval air issues that the Chief of Naval Operations (CNO) considers important enough to inform the various aspects of Naval service. This issue has numerous articles concerning Joint Flight Training. These articles range from JPATS, the new T-45 Training System, joint instructor and student training, to Joint Flight Training. The Joint Flight Training addressed only includes the Joint Primary Phase, the different phases in the Tanker-Transport-Maritime Patrol track, and Joint Naval Flight Officer/Air Force Navigator Training. Rear Admiral William B. Hayden, Chief of Naval Air Training Command (CNATRA), discusses each of these topics in his lead article for that issue.[18] However, no mention is made of the Fighter-Bomber or Fighter-Attack tracks by Admiral Hayden or in any of the other articles except for a diagram of the Joint Flight Training programs.

After completing Joint Primary training, SNAs selected for the Navy Fighter-Attack track will continue training in one of the two Navy strike training programs. NAS Meridian trains SNAs in the former two phase Strike program. The Intermediate Strike Phase introduces SNAs to the T-2C jet (Figure 7) and Naval tactical aviation (Navy TACAIR). The Intermediate Strike Training Curriculum outlines the academic, simulator, and aircraft training requirements for this phase of training that is based on 116 training days or approximately 24 weeks.[19]

Since the Navy uses different terminology, the simulator and aircraft allocation tables for this study organize the various Navy training missions to be similar to the organization in the Air Force tables. T-2C Intermediate Strike Training allocations are as follows:

Table 4.--Intermediate Strike Training Curriculum Sorties/ Hours per Stage

Stage	Simulator	T-2C	
		Dual	Solo
Familiarization			
Fam	8/ 12.0	13/17.8	3/ 3.9
OCF	-	2/ 2.4	-
Night Fam	-	2/ 2.2	2/ 1.9
Instrument			
Basic Inst	8/12.0	3/ 4.5	-
Radio Inst	7/10.5	3/ 4.8	-
Formation	-	11/15.4	4/ 5.6
Airways Nav	5/ 8.5	5/11.9	-
Air-to-Air Gunnery	-	6/ 7.2	2/ 2.4
Carrier Qual	-	1/ .6	9/ 5.4
Subtotal	-	46/66.8	20/19.2
TOTAL	28/43.0	66/86.0	

Source: U.S. Navy, Intermediate Strike Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 22 June 1995), 9.

Academic training is designed to prepare SNAs for each phase of simulator and flight training. Graded simulator sorties are performed with a student and an IP. Additional non-graded proficiency simulators, which do not include IPs, may also be scheduled by SNAs.

Instructors in the T-2C have had at least one fleet assignment as Navy TACAIR pilots and introduce SNAs to Aerial Gunnery and Aircraft Carrier Qualification training. Unlike the old Intermediate Strike Training phase, the new T-2C curriculum no longer requires SNAs to perform arrested landings aboard an aircraft carrier.[20] SNAs now only perform Field Carrier Landing Practice (FCLP) procedures at the training base.

After the Intermediate Strike phase, SNAs progress to the TA-4J (Figure 8) and the Advanced Strike Training Curriculum. Advance Strike Training introduces SNAs to a higher performing aircraft and to more advanced Navy TACAIR skills. Academic, simulator, and aircraft training continue to develop SNAs skills and the phase lasts 125 training days or approximately 25 weeks.[21] IPs in this phase are also former Navy TACAIR pilots with at least one tour in the fleet. Other Advanced Strike Training allocations are as follows:

Table 5.--Advanced Strike Training Curriculum Sorties/ Hours per Stage

Stage	Simulator	TA-4J	
		Dual	Solo
Familiarization			
Fam	7/13.5	8/10.4	1/ 1.4
OCF	-	1/ .8	-
Night Fly	-	4/ 4.2	2/ 2.8
Instrument			
Basic Inst	8/16.0	2/ 2.8	-
Radio Inst	11/22.0	4/ 5.7	-
Applied Inst	-	4/ 6.2	1/ 1.6
Formation			
Basic Form	-	3/ 4.2	2/ 2.8
Tactical Form	-	3/ 4.2	1/ 1.4
Navigation			
Airways Nav	8/16.0	5/ 8.1	-
Op Nav	-	6/ 8.4	1/ 1.3
Weapons	-	5/ 5.5	6/ 6.6
ACM	-	6/ 7.9	7/ 6.8
Carrier Qual	-	1/ .8	13/ 9.6
Subtotal	-	52/69.2	34/34.3
TOTAL	34/67.5	86/103.5	

Source: U.S. Navy, Advanced Strike Student Flight Training (NAS Corpus Christi, Texas: Chief of Naval Air Training, 21 August 1990), 7.

Navy Advanced Strike Training expands the SNAs tactical experience with additional training in air-to-ground weaponry, Air Combat Maneuvering (ACM), and an aircraft carrier qualification stage. This training provides SNAs with the required training to prepare them

for their fleet aircraft and follow-on training assignments. Prior to graduating and receiving their wings, SNAs must successfully complete two touch-and-go landings and ten arrested landings aboard an aircraft carrier.[22]

The Navy's new Fighter-Attack track is conducted at NAS Kingsville in the new T-45A jet aircraft (Figure 9). The T-45TS Strike Flight Training Curriculum consolidates both the T-2C and TA-4J training requirements into a shorter single aircraft track. Strike Flight Training allocations are:

Table 6.--Strike Flight Training Curriculum Sorties/ Hours per Stage

Stage	Simulator (IFT & OFT)	T-45A Dual	T-45A Solo
Phase I			
Familiarization			
Fam	20/28.0	12/ 16.4	2/ 3.0
OCF	1/ 1.0	1/ .7	-
Night Fam	1/ 1.5	2/ 2.3	1/ 1.5
Instrument			
Basic Inst	8/12.0	3/ 4.5	-
Radio Inst	7/10.5	6/ 9.6	-
Inst Rating	4/ 6.0	3/ 5.1	-
Formation	5/ 7.5	14/ 21.0	3/ 4.5
Airways Nav	8/12.0	7/ 12.3	2/ 5.1
Carrier Qual I	3/ 2.0	1/ .8	8/ 4.8
Phase II			
Op Nav	3/ 3.9	7/ 8.9	1/ 1.2
Weapons	5/ 5.0	4/ 5.2	4/ 5.1
Formation			
Tac Form	-	3/ 4.2	1/ 1.4
Night Form	1/ 1.5	2/ 3.0	1/ 1.5
Air-to-Air Gunnery	1/ 1.0	6/ 7.2	2/ 2.4
ACM	-	7/ 7.9	6/ 6.8
Carrier Qual II	3/ 3.5	-	10/ 9.6
Subtotal	-	78/109.1	41/46.9
TOTAL	70/95.4	119/156.0	

Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 4-5.

This track accomplishes the same requirements, but with fewer combined flying hours and training time. Training days are decreased to 195 days or approximately 39 weeks[23] and T-45 IPs have the same qualifications as those instructing in the T-2C and TA-4J.

Memorandum of Understanding (MOU)

The last service related publication is a "Memorandum of Understanding Between the US Air Force Air Education and Training Command and the US Navy Chief of Naval Education and Training." The MOU details the agreements between the Air Force and Navy to commence Joint Pilot Training. These agreements are primarily administrative in nature, including the section on training. However, the MOU references and is based upon the Secretary of Defense's and the joint Secretary of the Air Force and Secretary of the Navy's Memorandums.[24]

Staff Working Papers

CNATRA has an overhead slide presentation on Primary Pilot Training. The slides cover various issues and aspects of Joint Flight Training, including projected pilot and navigator requirements for the Air Force and Navy. It also lists a few areas of concern from a naval point of view. The first lists the perceived differences in Air Force Joint SUPT and Navy Primary: grading criteria, landing pattern, emergency procedures training, and student flow. The second lists perceived cultural differences between the two services: command and control, decision making, regulation vs. instruction, check ride philosophy, and IP training.[25] Although these differences have been identified in the Joint Primary Phase, they can also provide insight to answering this study's supporting questions on joint fighter track consolidation.

The latest staff working paper reviewed is one by the Air Staff (Air Force). This "Point Paper on Consolidated Undergraduate Flying Training, Jun 1993 to Oct 1995" overviews the Joint Flying Training program. There is no mention of consolidating the fighter tracks, only that the Air Force and Navy will have Fighter-Bomber and Fighter-Attack tracks in the Advanced Phase of Joint Pilot Training.[26]

Telephone Interviews

Telephone interviews were conducted to cover the gaps discovered while performing the comparative and evaluative analyses. Air Force staff agencies at Headquarters 19th Air Force, AETC, and the Air Staff and Navy staff agencies at CNATRA and the CNOs Joint Training staff were contacted and questioned. Staffs had varying degrees of fighter, joint service, and Joint Pilot Training knowledge. New arrivals and non-fighter staff officers were in several staffs. Those staff agencies that had officers with fighter-type backgrounds or were conversant on the other service's undergraduate fighter training had a greater understanding of this study's issues. Many staff officers were not very conversant on the other service's fighter training system, but added that they wished they were.[27] However, the staffs knowledge base was greatest in the Joint Primary Phase and associated issues.

During and after the comparative analysis, staffs were questioned in an effort to clarify areas of uncertainty or mis-understanding in the training syllabi. The turnover rate inside the staffs was not too detrimental to this study. The overall knowledge of the other services fighter training was a little more disheartening. This did not distract from their ability to answer most of the programmed questions for the interviews, as listed in Appendix A. Since the Joint Primary Phase and Joint Tanker-Transport-Maritime Patrol tracks are the only Joint Pilot Training programs, the lack of fighter

knowledge in the staffs is understandable. However, if future consolidation is to occur in the fighter training tracks, then the services will need to reconsider their staff demographics.

Summary

In chapter 2, available literature on Joint Pilot Training and specifically fighter-type pilot training was reviewed. The reviewed information demonstrates that the military services have already increased jointness in many aspects of pilot training. However, the reviewed material indicates that there may be little effort, if any, to pursue consolidation in the Air Force and Navy fighter training tracks. The remainder of this study addresses this issue.

Endnotes

[1]Richard W. Stokes, Jr., Lieutenant Colonel, U.S. Air Force, "Joint USN/USAF Pilot Training: An Operational Concept" (Individual Study Project, U.S. Naval War College, 1989), 21-24.

[2]Colin L. Powell, General, U.S. Army, Chairman of the Joint Chiefs of Staff Report on the Roles, Missions, and Functions of the Armed Forces of the United States (Washington, D.C.: National Defense University Press, February 1993), 20.

[3]Ibid.

[4]Les Aspin, Secretary of Defense, "Memorandum on the Roles, Missions, and Functions of the Armed Forces of the United States" (Washington, D.C.: Office of the Secretary of Defense, 15 April 1993), Attachment, p. 2.

[5]Ibid.

[6]Michael B. Donley, Acting Secretary of the Air Force, and Frank B. Kelso, II, Acting Secretary of the Navy, "Memorandum on Joint Fixed-Wing Training" (Washington, D.C.: Offices of the Secretary of the Air Force and Secretary of the Navy, 9 July 1993), Attachment p. 2.

[7]"Easing the Burden: Restructuring and Consolidating Defense Support Activities" (Washington, D.C.: Congressional Budget Office, July 1994), 68.

[8]Deputy Secretary of Defense, "Memorandum on Consolidation of Fixed-Wing Flight Training" (Washington, D.C.: Office of the Secretary of Defense, 24 October 1994), cover letter.

[9]Henry Viccellio, Jr., General, U.S. Air Force, "The Joint Challenges to Interservice Training," Joint Force Quarterly 7 (Spring 1995): 47.

[10]U.S. Air Force, T-38 Undergraduate Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 39-42.

[11]Ibid., 35-37.

[12]Ibid., 44-45.

[13]Ibid., 1.

[14]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.

[15]U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1994), iii.

[16]Ibid., 1-1.

[17]1995 Air Force Issues Book (Washington, D.C.: Department of the Air Force, 1995), 29.

[18]William B. Hayden, Rear Admiral, U.S. Navy, "The New Naval Air Training Command," Naval Aviation News (Washington, D.C.: Naval Historical Center, September-October 1994), 10-12.

[19]U.S. Navy, Intermediate Strike Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 22 June 1995), 1.

[20]Ibid., 9.

[21]U.S. Navy, Advanced Strike Student Flight Training (NAS Corpus Christi, Texas: Chief of Naval Air Training, 21 August 1990), vi.

[22]Ibid., 173.

[23]U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), iii.

[24]"Memorandum of Understanding Between US Air Force Air Education and Training Command and US Navy Chief of Naval Education and Training" (Randolph AFB, Texas and Washington, D.C.: Headquarters Air Education and Training Command and Chief of Naval Education and Training, no date), 1.

[25]"Primary Pilot Training," Slide presentation (NAS Corpus Christi, Texas: Chief of Naval Air Training, no date), 1.

[26]"Point Paper on Consolidated Undergraduate Flying Training, Jun 1993 to Oct 1995" (Washington, D.C.: Department of the Air Force, no date), 2-4.

[27]It was commented by one staff officer that the author probably has more experience and knowledge of each service's fighter-type training than most anyone on the staffs working the current issues.

CHAPTER 3

RESEARCH DESIGN

Chapter 3 explains the research plan and methodology. The research focuses on an answer to this question: Can Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks be consolidated? To assist in answering this research question, five supporting questions are investigated. Each supporting questions provides additional insight into the various phases and stages of training that have commonality for consolidation.

This study uses comparative and evaluative analyses to explain the feasibility of consolidating Air Force and Navy fighter training. Research material for this thesis is based on eight sources: a research project, a government publication, Department of Defense (DOD) documents, service publications, a Memorandum of Understanding (MOU), staff working papers, periodicals and journals, and telephone interviews. The remainder of this chapter details the two analyses and the research sources.

Comparative Analysis

Chapter 4 provides a comparative analysis of the Air Force Fighter-Bomber training track and the Navy Fighter-Attack training track. This comparative analysis highlights similarities and differences. Similarities define common phases or stages of training which can be consolidated. Differences define which phases or stages may not be compatible for consolidation. The differences may reinforce

the current tendency to maintain separate fighter training, or may uncover areas requiring future investigation for consolidation.

Chapter 4 primarily addresses one supporting question: Is the training in the fighter-Bomber and Fighter-Attack training tracks compatible for consolidation? A comparative analysis is used to answer this supporting question. Chapter 4 also lays the foundation to answering other supporting questions. Potential barriers to consolidation and service attitudes to the compatability for consolidating the two fighter training tracks are indirectly addressed in the comparative analysis. This comparative analysis will present issues that address both the feasibility and the difficulty of consolidating the two fighter training tracks.

The primary information sources used in the comparative analysis are service publications and telephone interviews. The training curricula and course syllabi are the foundations of the comparative analysis. These publications list the training events, academic, simulator, and flight training, that students must complete before graduating to the next phase of training. Academic and simulator training is addressed, but the primary emphasis is on flight training. Telephone interviews with the training OPRs help answer questions that arise during the study of the syllabi.

Evaluation Analysis

Chapter 5 presents the evaluative analysis and conclusion of this thesis. This chapter answers the four remaining supporting questions and highlights the supporting question addressed in chapter 4. The evaluative analysis determines the feasibility of consolidating Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks and assesses the level of consolidation that may be possible.

All five supporting questions are answered in the evaluative analysis section of chapter 5. First, What phase of Joint Pilot Training implementation is the Air Force and Navy currently reviewing? This may address areas of research that will aid in determining training that may be compatible for consolidation. Second, highlight the similarities and differences in the two training tracks by answering the question, Is the training in the Fighter-Bomber and Fighter-Attack training tracks compatible for consolidation? Issues uncovered in the comparative analysis are addressed in answering this supporting question. Third, How would consolidation of the fighter training tracks benefit each service? Before either service or the Department of Defense will further consolidate pilot training tracks, such as the fighter tracks, there must be a substantial benefit to the services. Fourth, What barriers may have to be overcome to facilitate joint fighter training? These barriers may be a root cause of the current separate service fighter tracks. Finally, the fifth supporting question, Do the Air Force and Navy consider joint fighter pilot training compatible? This question may present other obstacles to consolidation that do not appear after a casual look at the pilot training being conducted by the Air Force and Navy.

Again, the primary information sources are service publications and telephone interviews. Appendix A lists questions to be addressed during the telephone interviews with the Air Force and Navy staffs. The questionnaire focus is on answering the supporting questions. The first interview question directly relates to the first supporting question. The second and third interview questions support the third supporting question. The questionnaires fourth, fifth, and sixth interview questions address the second supporting question. Interview questions seven and eight relate to the fourth supporting question. Finally,

interview questions two, six, seven, and eight all support the fifth supporting question. Other background sources support the analysis and research questions.

The evaluative analysis in chapter 5 also includes the thesis conclusion and recommendations for further research. If the evidence cannot support and justify consolidating overall fighter training tracks, then those specific phases and stages of training that are feasible for consolidation will be addressed.

Research Sources

Gathering objective data on Air Force and Navy fighter training tracks was easy. However, gathering data on consolidating the fighter training tracks was difficult due to limited information on this particular subject. General Powell's recommendation to consolidate follow-on flight training into four tracks (Navy Fighter-Attack, Air Force Fighter-Bomber, Navy and Air Force Tanker-Transport-Maritime Patrol, and Helicopter)[1] is being implemented and staffed. The transition to Joint Pilot Training has been made, but has been difficult; many issues are still being debated today.

The background information in chapter 2 starts with a research project "Joint USN/USAF Pilot Training: An Operational Concept." This 1989 report was on file in the Combined Arms Research Library (CARL). It is general in nature and uses historical references to lay the foundation for the Air Force and Navy pilot training programs. The author used many telephone interviews with Air Force staff agencies, but no Navy staffs, to support his thesis that consolidation of pilot training was possible.[2]

Government publications, such as the CBO report, were found in the CARL. The CBO report provided an interesting perspective on the Joint Pilot Training issue. A side note in the CBO report is a figure

used to present flight time required by the services to train their fixed-winged and rotary-winged aviators. Figure 1 on page seventy-one identifies AT-38 flight training, "IFF," as Identification, Friend or Foe,[3] rather than Introduction to Fighter Fundamentals.[4] Not all reporting agencies are as familiar as they should be with Joint Flight Training or with aviation.

DOD publications and documents reviewed for this study provided an overview for the current Joint Pilot Training program. Recent actual memoranda and recommendations from the Secretary of Defense, Deputy Secretary, and the Chairman of the Joint Chiefs of Staff were obtained through direct contacts with the Air Staff. The Chairman's recommendation noted in the "Roles, Mission, and Functions" report is on file in the CARL. These sources present the Department of Defense's senior-level leadership's perception of joint pilot training and the continued efforts underway by the Air Force and Navy evaluate Joint Pilot Training.

Service related publications and documents for pilot training were ordered from the services' Offices of Primary Responsibility (OPRs). The Air Force OPR for pilot training and joint pilot training is Headquarters 19th Air Force at Randolph AFB, Texas. They produce and control training syllabi, such as Introduction to Fighter Fundamentals and Specialized Undergraduate T-38 Pilot Training. The Chief of Naval Air Training at NAS Corpus Christi, Texas is the Naval OPR for its pilot training curricula. They also produce and review pilot training curricula, such as Intermediate Strike Training Curriculum and T-45TS Strike Flight Training Curriculum. These two headquarters work together to formulate most Joint Pilot Training issues.

A MOU between the Air Force and Navy on Joint Pilot Training issues reinforces the notion that fighter training should remain service

oriented training. Staff working papers and presentations are also areas of information needed to answer the study's questions. The working papers and presentations are general in nature. They pertain mainly to Joint Pilot Training and Joint Flight Training as a whole. In most cases documents from these sources were provided by junior members of staffs or from personal acquaintances. Those obtained from senior members were, at times, released somewhat reluctantly. Reviewing the numerous charts and timelines in the working papers and presentations provided a better understanding of the processes involved in constructing joint pilot training. This understanding helped in developing questions used in later research.

Additional information on AETC and CNATRA perspectives were found in two military journals. The Commander of AETC wrote a joint training article in Joint Forces Quarterly and the Commander of CNATRA wrote an article in Naval Aviation News. Both of these issues are located in the CARL.

Some subsequent information gaps uncovered during the research were answered in telephone interviews. Conflicting data, areas that needed clarification, and areas that required further investigation were also answered by questioning Air Force and Navy staffs at their various headquarters. Initial inquiries of numerous Air Force staffs were through personal acquaintances. Due to past associations, objectivity and validity was obtained by conducting Air Force staff interviews with non-acquaintances as much as possible. Naval staff contacts were accomplished through the Joint Primary Phase office in AETC, then in CNATRA, and finally to the Navy Staff at the Pentagon. Naval staff interviews were conducted in the same manner as with the Air Force staffs.

Evidence of service rivalry and some reluctance to speak candidly and completely during the telephone interviews did not occur as often as anticipated. However, the expected general knowledge level of a few staff officers on this study's topic was less than anticipated. Therefore, screening and objectively interpreting the interview results was a crucial factor in the evaluation of the research findings.

Telephone interviews were conducted with Air Force staff agencies at 19th Air Force and AETC at Randolph AFB, Texas, and the Air Staff at the Pentagon. Interviews with Navy staff agencies included CNATRA at NAS Corpus Christi, Texas and the CNO Joint Training officer at the Pentagon. Follow up telephone interviews were used during both the comparative and evaluative analyses of this thesis.

Summary

The purpose of the thesis research design is to answer the supporting questions, and ultimately, the primary research question. The research design includes both comparative and evaluative analyses. Each analysis addresses specific questions. Chapters 4 and 5 will provide the analyses needed to answer the supporting questions and the primary research question.

Endnotes

[1]Colin L. Powell, General, U.S. Army, Chairman of the Joint Chiefs of Staff Report on the roles, Missions, and Functions of the Armed Forces of the United States (Washington, D.C.: National Defense University Press, February 1993), 20.

[2]Richard W. Stokes, Jr., Lieutenant Colonel, U.S. Air Force, "Joint USN/USAF Pilot Training: An Operational Concept" (Individual Study Project, U.S. Naval War College, 1989), 1-28.

[3]"Easing the Burden: Restructuring and Consolidating Defense Support Activities" (Washington, D.C.: Congressional Budget Office, July 1994), 71.

[4]In general aviation, Identification, Friend or Foe is also abbreviated as IFF.

CHAPTER 4

COMPARATIVE ANALYSIS

This chapter compares the Air Force and Navy fighter training tracks to present the similarities and differences in the two programs. Chapter 4 is divided into the following sections for the comparison: Joint Primary Phase, the Advanced Phase's academic training, simulator training, and flight training. The Joint Primary Phase lays the foundation for the training in the Advanced Phase. Academic and simulator training enhance flight training and operations. The focus of this chapter is on the flight training conducted in the two fighter training tracks.

Currently, the Air Force and Navy each have two training programs in the Advanced Phase of Joint Pilot Training. This comparative analysis focuses on the Air Force's SUPT and IFF programs and the Navy's Strike Flight Training program. These are the two new and future service fighter training programs. UPT and Intermediate and Advanced Strike Training are being phased out and will be addressed only as required.

A review of the Joint Primary Phase precedes the comparative analysis of the Advanced Phase training tracks. Differences in actual student training provide the foundation for comparing the different Advanced Phase fighter tracks in the Air Force and Navy.

Joint Primary Phase

Air Force T-37 Joint Specialized Undergraduate Pilot Training has three training categories. The Primary Category consists of 50

sorties and 66.0 hours of training.[1] All Air Force and Navy students must complete this category prior to progressing to the Intermediate Category. The Intermediate Category includes an additional 18 sorties and 23.0 hours.[2] This category in divided into two parts, one for all Air Force students and one for non-Fighter-Attack SNAs. All Air Force student pilots graduate from the Joint Primary Phase, Primary Category and Air Force Intermediate Category, with 68 sorties and 89.0 hours before proceeding to the Advanced Phase training tracks.[3] Navy Fighter-Attack candidates complete the Primary Category only and then proceed to the Navy Advanced Phase. The non-Fighter-Attack SNAs continue training in the Navy Intermediate Category and graduate from the Joint Primary Phase with 68 sorties and 89.0 hours.[4]

The Navy Joint Primary Phase is similarly structured. Navy Fighter-Attack candidates graduate from the Primary Phase with 36 T-34C sorties and 66.4 hours and then proceed to the Advanced Phase Fighter-Attack track.[5] The non-Fighter-Attack SNAs continue in the appropriate Naval Intermediate Phase and graduate with an additional 26 hours (Joint Primary Phase total, 92.4 hours).[6] All Air Force student pilots continue in the Air Force Intermediate Phase and also graduate with an additional 26 hours (Joint Primary Phase total, 92.4 hours) and then proceed to the applicable Air Force Advanced Phase.[7]

After reviewing the Joint Primary Phase, the study continues with the Advanced Phase of pilot training. This study divides the Advanced Phase fighter track training into academic training, simulator training, and flight training.

Academic Training

Academic training involves the class room environment with instructor led and/or self-paced student learning. The design of the vast majority of academic training is to enhance simulator and flight

training. Other academic training during pilot training is service specific professional development training.

Academic training is the first requirement prior to commencing either simulator or flight training. Normally, civilian contract instructors or IPs conduct the initial formal training sessions. Afterwards, the students themselves continue academic training, in groups or as individuals, in a self-paced environment. Academic training must be accomplished and annotated prior to specific simulator missions or flight missions. Self-paced training includes computer generated programs, audio-video programs, phase manual programs, and other locally developed and approved course-related training.

Academics in the Air Force's Fighter-Bomber Advanced Phase varies slightly between SUPT and the older UPT. The additional training in SUPT is fighter-related academic training. The same applies to the Navy's Fighter-Attack tracks. Academic training requirements have been condensed in the new T-45A Strike Flight Training curriculum due to a single aircraft type flown in the track as opposed to the former T-2C Intermediate and TA-4J Advanced Strike Training curricula. SUPT and Strike Flight Training formal academic training and hours are listed below:

SUPT Academics[a]	Hours	Strike Flight Academics[b]	Hours
Aerospace Physiology	7.5	Aviation Student Indoctrination	7.3
Crew Resource Management	3.0	Engineering	30.3
Centrifuge Training	2.3	Aerodynamics	7.5
Aircraft Mishap Prevention	1.0	Meteorology	4.8
T-38 Systems Operation	19.0	Flight Rules and Regulations	4.3
Applied Aerodynamics	23.0	Instrument Navigation	12.1
T-38 Advanced Formation	6.0	Operational Navigation	14.5
T-38 Flight Planning	27.5		
Annual Instrument Examination	6.0		
TOTAL	95.3		80.8

[a]SUPT's T-38 Academic course of instruction. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.
[b]Strike Flight Training's Academic course of instruction. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 6.

The subject matter is similar, just called different names depending on service orientation. Student self-paced academic training, Air Force Ground Training and Navy Flight Support Training, comprises the remainder of academic training. Air Force Ground Training is another 66.0 hours of training[8] and Navy Flight Support Training is 106.1 hours of additional training.[9] There appears to be at least a forty hour difference in self-pace training. However, when Air Force IFF academic training is added to the SUPT training, another 39.8 (A Track) to 56.1 hours (B and C Track) of formal training is instructed.[10]

Total hours of academic training in the Air Force and Navy Advanced Phase of pilot training is comparable. Subject matter areas are also comparable. At this level, little difference is noted in academic training.

Simulator Training

After initial academic training in each Air Force phase and Navy stage, simulator sorties build upon academic lessons and prepare students for the rigors of up coming aircraft flights. As listed in the tables from chapter 2, each phase and stage has a minimum number of required simulator sorties. This does not prevent students from scheduling additional simulators.

Air Force SUPT and UPT simulator requirements are the same. SUPT simulator training focuses on the Instrument Phase with fifteen of the twenty-two simulator sorties (Table 2). IFF is predominately a flight intensive training environment which includes only two instrument simulator sorties.[11] The first simulator is a refresher to prepare students for flying after the usual three to four week layoff between SUPT graduation and IFF training, is completed prior to the first

flight. The other is completed prior to IFF graduation to introduce students to unique fighter instrument recovery procedures.

The quantity of Strike Flight Training simulators differs from the Intermediate and Advanced Strike Training, due to a single aircraft and new training technology associated with the T-45 Training System. This new system provides an additional simulator to enhance SNA training. The normal Instrument Flight Trainer (IFT) is supplemented with a new Operational Flight Trainer (OFT). The OFT allows SNAs to practice training events other than standard instrument training or basic flight instruction that is normally performed in the IFT. The new OFT accounts for forty-nine sorties while the IFT accounts for only twenty-one sorties.[12] Currently the Air Force does not have this type of simulator in SUPT, UPT, or IFF.

Strike Flight Training has seventy required simulator sorties (Table 6), roughly three times the number required by SUPT and IFF. From Table 6, the T-45 simulator sorties include fifteen in the formation, weapon deliveries, and low altitude phases of flight. SUPT and IFF have no comparable requirements. Six additional simulator sorties are dedicated for the two Carrier Qualification Stages. This accounts for twenty-one of the seventy sorties. The remainder of the sorties are in the Familiarization Stages (twenty-two) and Instrument and Navigation Stages (twenty-seven). SUPT and IFF combined total twenty-three simulator sorties.

If one were to disregard the T-45's OFT, both the Air Force and Navy accomplish similar simulator training. Strike Flight Training's OFT gives the Navy a unique simulator capability that is not available in SUPT and IFF. Additional simulator training is required in Strike Flight Training to introduce SNAs to the transition to the aircraft carrier landing environment and landing techniques. Overall, simulator

training does produce differences in the two fighter tracks. These differences are not insurmountable, but would have to be addressed prior to any future consolidation.

Flight Training

After completing the required academic and simulator training events, students now prepare for flight training. Both services have a minimum number of flight sorties that students must accomplish. Additional flights may be required to make up flights not completed, either due to flight conditions or unsatisfactory performance.

The remainder of this chapter focuses on SUPT, IFF, and Strike Flight Training. SUPT and IFF conduct flight training in phases and subphases. Strike Flight Training conducts pilot training in Modules which may consist of one or more different stages of training. Modules 00 and 1 are pure academic modules, Modules 2 through 4 are Phase I training, and Modules 5 through 9 are Phase II training. The SUPT, IFF, and Strike Flight Training formal flying phases and stages are listed below:

SUPT[a] Phases and IFF[b]	Strike Flight Stages by Modules[c]
Contact	2 Familiarization and Instrument
Instrument	3 Inst, Form, and Night Fam
Formation	4 Carrier Qual--Phase I
Navigation	5 Operational Nav and Weapons
IFF	6 Airways Nav, Tactical Form, and Night Formation
AHC/Formation	
BFM	7 Air-to-Air Gunnery
Surface Attack	8 Air Combat Maneuvering
Low Altitude Ops	9 Carrier Qual--Phase II

[a]SUPT's T-38 training Phases. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.
[b]IFF's training Phases. Source: U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1994), 1-3.
[c]Strike Flight Training's Modules. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 9-11.

In general, IFF and Phase II are fighter specific training. SUPT, IFF, and Strike Flight Training phases and stages will be segmented as required in order to compare similar types of training. Each of the phases and stages is compared to highlight the similarities and differences in the Fighter-Bomber and Fighter-Attack tracks.

This section divides the above training into five subsections: Contact and Familiarization, Instrument, Formation, Navigation, Fighter Related Training, and Carrier Qualification. Each subsection also addresses night, solo, and formation requirements which are all important for fighter training. The first subsection is Contact and Familiarization.

Contact and Familiarization

SUPT divides the Contact Phase into eight subphases. For the purpose of this study, the Familiarization Stage in Navy Strike Flight Training will consist of the Familiarization and the Night Familiarization Stage. The Contact Phase (from Table 2) and Familiarization Stages (from Table 6) breakdown are as follows:

SUPT[a]	Dual	Solo	Night
Presolo Contact	6	0	-
Presolo Contact	5	0	-
Initial Solo	-	1	-
Basic Exercises	5	4	-
Contact Evaluation	1	-	-
Night Contact	1	0	1
Night Solo	-	1	1
Contact/AHC	4	0	-
TOTAL	22	6	2

Strike Flight Training[b]	Dual	Solo	Night
Familiarization	12	2	-
Night Familiarization	2	1	3
TOTAL	14	3	3

[a]SUPT's T-38 Contact Phase. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 29-32.
[b]Strike Flight Training's Familiarization Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 65-66, 70-71, 79.

Although Night Familiarization is in a different module than the bulk of the Familiarization training, it is similar to the night subphase in the Air Force Contact Phase and is compared in this subsection.

Training in this subsection focuses on enhancing the students' abilities and increasing their confidence in operating their aircraft. Mastering aircraft handling in the normal flight regimes, including an introduction to night flying procedures, and in some scripted abnormal flight regimes is the emphasis of Contact and Familiarization. Both services emphasize emergency procedures and patterns in order to safely recover crippled aircraft. Landing pattern procedures, including touch-and-go and takeoffs, are repeatedly performed. The landing and takeoff environment is an extremely hazardous and critical phase of flight and before students are allowed to solo, they must demonstrate the necessary skills to take-off, fly, and land their aircraft.

Students in the fighter tracks fly higher performance aircraft than those flown in the Joint Primary Phase. Instead of cruising through the sky between 100 and 200 knots as in the T-37B and T-34C, they now cruise in the T-38A or T-45A at 300 knots or more. They have been identified as having the ability to handle increased levels of stress and to cope with rapidly changing environments. This portion of training ensures that all students are able to safely takeoff, fly, and land their aircraft before transitioning to another phase of training.

Finally, the Contact Phase and Familiarization Stages are not flown to completion before entering the next phase of training. Each service dedicates several sorties to be flown later in other phases of training. These basic sorties are used to ensure students maintain their landing proficiency or general flying skills while flying in other phases of training.

Differences in this subsection are not numerous. The most notable is the sortie distribution difference. SUPT allocates twenty-eight sorties (six solo) in the Contact Phase while Strike Flight Training only allocates seventeen (three solo) sorties in the Familiarization. A minor difference in this phase is that SUPT requires one of the Contact/AHC sub-phase sorties to be a maximum power climb angle and supersonic flight, also known as the "zoom and boom" ride.[13] This is a SUPT unique sortie due to the T-38 being a supersonic capable aircraft and the T-45 is not.

Another difference is the application of the basic night sorties. SUPT combines the one dual and one solo flight with the one night formation (dual) flight from the Formation Phase. The Night Contact and Solo subphases concentrate on night landings and include some instrument work. The Navy flies the Night Familiarization sorties (two dual, one solo) in Module 3 prior to the Instrument Rating Stage. Strike Flight Training emphasizes the instrument aspects of night flying and night landing techniques.[14]

It must be noted that the Air Force and Navy have different landing procedures. The Air Force trains pilots to "flare" their landings, i.e., landing with a low 200 to 300 feet per minute descent rate. Navy aviators literally fly their aircraft onto the landing surface at approximately 600 feet per minute, virtually a "controlled crash." This fundamental difference will have to be addressed in order to consolidate any training in the fighter tracks of the Advanced Phase.

Another major difference in this subsection, as well as in the remaining subsections, is the administering of flight evaluations. The Air Force has a very formal method of administering check rides. Selected IPs, Flight Examiners, are trained as check pilots who administer check rides to students. Generally, there is one check ride

(evaluation flight) per phase of training. Check pilots do not perform instructor duties during these check rides. They observe and evaluate the student's performance. Check ride performance is an important factor in calculating class rankings and eventual assignment selections. This one sortie is a measure of the student's ability to perform the required phase events to course standards and can be a dramatic event for an Air Force student pilot.

The Navy's check flights also measure the SNA's skills. Unlike the Air Force, the Navy flies a check flight on the last dual sortie prior to a solo flight and/or at the completion of each stage of training. Therefore, SNAs may fly several check flights in each stage of training. In the Familiarization and Night Familiarization Stages, there are three check flights (two familiarization and one night formation), one before each solo.[15] These check flights are also important to SNAs for the same reasons as those stated above. Selected IPs are designated as Evaluation Pilots for check flights and a few are designated as Naval Aviation Training Operations Procedures and Standardization (NATOPS) Instructors. NATOPS IPs, equivalent to an Air Force Flight Examiner, administer the written examinations, NATOPS simulators, and some Instrument Ratings. Other Navy IPs are qualified only as Instrument Ratings evaluators. The NATOPS and Instrument Ratings flights are the equivalent to Air Force check rides. An evaluation pilot may offer instruction to a SNA when the SNA is not achieving course standards for an event. This is a notable difference to Air Force Flight Examiners. These check ride philosophy differences are apparent in all phases and stages of Air Force and Navy training.

Instrument

SUPT's Instrument Phase has three subphases, one of which is the phase's evaluation flight. This study combines Strike Flight

Training's Basic Instrument and Radio Instrument Stages from Module 2 for the comparison with the Air Force Instrument Phase. The Instrument Rating Stage in Module 3 would normally be included in this subsection; however, it more closely resembles SUPT's Navigation/Instrument Evaluation subphase and is compared in the Navigation subsection. SUPT and Strike Flight Training Instrument training from Tables 2 and 6 are as follows:

SUPT[a]	Dual	Solo	Night
Basic Instrument	4	0	-
Basic Instrument Evaluation	1	-	-
Instrument	7	0	-
TOTAL	12	0	0

Strike Flight Training[b]	Dual	Solo	Night
Basic Instrument	3	0	-
Radio Instrument	6	0	-
TOTAL	9	0	0

[a]SUPT's T-38 Instrument Phase. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 1.
[b]Strike Flight Training's Instrument Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 32-33.

Instrument training is fairly universal and, therefore, extremely similar between the two services. Both services conduct this training in day VFR conditions or if the weather permits, day Instrument Flight Rules (IFR). Instrument training teaches students to fly their aircraft without outside visual references. Instrument maneuvers, departures, and approaches are the primary tasks in this phase of training. All training is flown with an IP and no solo sorties are flown.

Apart from the difference of three sorties between the two programs, the only significant difference is the check flights. SUPT has the one formal check ride after the first subphase and Strike Flight Training has two check flights, the last flight in each stage.[16] A very minor difference is filing the sortie's flight plan, a DD Form 175. In

this phase, as in most phases of Air Force pilot training, SUPT uses stereo flight plans. These coded flight plans are relayed to Base Operations and are then filed with the Federal Aviation Administration (FAA). Strike Flight Training requires SNAs to fill out their own DD Form 175 and relay it to Base Operations, who then files it with the FAA.

This is one of the most comparable areas in the Fighter-Bomber and Fighter-Attack tracks. If check ride philosophy is discarded, this subsection is readily available for joint training.

Formation

The Formation subsection combines several phases and modules of training. This Formation subsection for the Fighter-Bomber track includes SUPT's Formation Phase's seven subphases and IFF's Formation Phase. The Fighter-Attack track Formation subsection consists of the Formation Stage (Module 3), the Tactical Formation Stage (Module 6), and the Night Formation Stage (Module 6). Air Force IFF Formation Phase training is conducted in post-SUPT graduation fighter training. Module 6 includes basic Navy formation training, which is in Phase II of Strike Flight Training.

Similarities between the two Advanced Phase fighter tracks are numerous. The names of the various formations differ, but the maneuvers and procedures are relatively the same. Examples of differing terminology between the Air Force vs. Navy include: two-ship or formation vs. two-plane or section, four-ship or multi-ship vs. four-plane or division, fingertip or close vs. parade, route vs. cruise, and pitch-out and rejoin vs. break-up and rendezvous (see Appendix B).

Training begins with the basic formation positions: fingertip/parade, route/cruise, and the maneuvers required to move from one side of the lead aircraft to the other. Pitch-out and rejoins and break-up

and rendezvous practice formation and section rejoins. After the basics, more fluid maneuvers introduce students to energy management, three-dimensional maneuvering, and additional aircraft position mechanics. SUPT dedicates nine sorties (one solo) and Strike Flight Training has twelve (two solo) sorties for instructing formation fundamentals. A breakdown of Tables 2, 3, and 6 for the Formation subsection is as follows:

SUPT[a]	Dual	Solo	Night	≥3-Ship
Presolo Two-Ship Basic	4	0	-	-
Day Two-Ship Basic Maneuvering	4	1	-	-
Two-Ship Intermediate	7	3	-	-
Two-Ship Tactical	6	4	-	-
Two-Ship Formation Evaluation	1	-	-	-
Two-Ship Night Orientation	1	0	1	-
Four-Ship Basic	3	1	-	4
IFF[b]				
Formation	4	0	-	1
TOTAL	30	9	1	5

Strike Flight Training[c]	Dual	Solo	Night	≥3-Plane
Formation	14	3	0	5
Tactical Formation	3	1	-	0
Night Formation	2	1	3	0
TOTAL	19	5	3	5

[a]SUPT's T-38 Formation Phase. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 40-42.
[b]IFF's Formation Phase. Source: U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1994), 1-2.
[c]Strike Flight Training's Formation Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 89-90, 183-184.

The next phase of formation flying is tactical formation. Normally, tactical formation is a line abreast formation with aircraft spaced four to nine thousand feet laterally apart and with some amount of altitude split between the leader and the wingman. The distance between the aircraft, as well as the altitude split, varies due to environmental concerns; sun angle, inflight visibility, skill levels, and the pre-briefed position are just a few examples. SUPT's Tactical Formation subphase and IFF dedicates fourteen sorties (seven solo) to

tactical formation training. SUPT's Two-Ship Intermediate subphase allows up to eight of its ten sorties to practice tactical formation, but these sorties are not dedicated solely for tactical formation.[17] Strike Flight Training dedicates four sorties (one solo) for tactical formation training.

Later, students fly larger formations of three and four aircraft. Initially, students practice basic multi-ship and division maneuvers: fingertip and parade, route and cruise, position changes, and rejoins and rendezvous. This training is only introductory. Additional three and four aircraft formations are flown in later phases and stages of training. SUPT and IFF multi-ship training in this phase totals five sorties (one solo). IFF's one four-ship formation sortie is an introduction to four-ship fighter operations and is flown as a two-ship for the second half of the mission.[18] Strike Flight Training has five sorties (one solo) dedicated to division operations.

Night formation training is also introduced. SUPT has a single sortie for night formation training, and Strike Flight Training has three sorties (one solo). There is no night training in IFF.

The major difference in formation training is the visual signals used during communications out procedures or in the case of an aircraft suffering radio failure. Position relationships, distances, and terminology are minor compared to the differences in visual signals, which can be interpreted as a safety of flight issue. Some signals, such as fuel states, flaps, and radio channel signals are the same. However, landing gear and lead changes, as well as numerous night signals, are significantly different.

The other differences in Air Force and Navy formation training are generally minor, with the exception of the number of sorties dedicated to basic formation training. SUPT and IFF Formation Phases

consist of thirty-nine sorties (nine solo) while Strike Flight Training Formation Stages total twenty-four sorties (five solo). The degree of instruction in procedures and maneuvers varies little; however, the Air Force emphasizes formation flying at this phase of training more than does the Navy. The Air Force prefers to emphasize formation at this phase so that future training, which requires aircraft formations, can dedicate more time to specified training than on formation procedures. This is not to say that basic formation procedures are not emphasized in Strike Flight Training or in later Air Force training. It is just a difference in training philosophies.

One minor difference is that SUPT requires five formation wing landings[19] and IFF requires an additional three wing landings.[20] This is an Air Force unique requirement. Both services perform formation and section take-offs, but only the Air Force does wing landings in pilot training.

Another minor difference is the check flight. SUPT has one formal check ride in the Formation Phase and an informal check flight at the end of the Formation Phase in IFF. The Navy has five check flights in the three formation stages, one prior to each major solo event or group of solo sorties.[21]

SUPT, IFF, and Strike Flight Training formation procedures are generally similar. The dedicated formation sortie distribution is more apparent in this subsection than in the previous two. Another and potentially hazardous difference is the visual signals used by the two services. Formation training will continue throughout the remainder of the various phases and stages of pilot training. These remaining sorties are not dedicated formation training flights, but the formation procedures are an essential and inseparable part of that training.

Navigation

The Navigation Phase in SUPT has been increased to better prepare students for fighter training. There are seven additional sorties in SUPT than in UPT (Tables 1 and 2). SUPT's Navigation Phase consists of six subphases. The last three subphases are low altitude training which are similar to Navy Phase II training in the Operational Navigation stage and are addressed in a later subsection. Strike Flight Training navigation training for this subsection includes the Airways Navigation Stage (Module 6) and the Instrument Rating Stage (Module 3). Navigation training in this subsection includes:

SUPT[a]	Dual	Solo	Night	Formation
IFR/VFR Navigation	7	0	1	1
Solo Out-and-Back	-	2	-	-
Nav/Inst Evaluation	2	-	-	-
TOTAL	9	2	1	1

Strike Flight Training[b]	Dual	Solo	Night	Formation
Airways Navigation	7	2	0	0
Instruction Rating	3	-	-	0
TOTAL	10	2	0	0

[a]SUPT's T-38 Navigation Phase. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 45-46.
[b]Strike Flight Training's Navigation-related Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 88, 90, 183.

Navigation training emphasizes using the FAA Airway System as well as flying VFR, "see and avoid." Cross-country flights flown to other military and civilian airfields broaden the students instrument and navigation experience. Cross-country flights require flight planning, weather updates and briefings, and ground movements in an unfamiliar environment. The Air Force and Navy use cross-country training to relate home field operations to those of other fields and to familiarize students with some of the differences in terminology, airfield markings, and landing aid systems.

Part of this phase also includes student solo out-and-back flights (Air Force) and out-and-in flights (Navy). These solo flights are similar to dual cross-country flights. Both services send "mother" ships along with the stream of solo students to check on the weather and assist with the "out" field operations.

During this phase of training, both services conduct flight evaluations. Unlike most of the other check rides, these two are very similar. The Air Force Navigation/Instrument Evaluation is a formal Air Force check ride, also known as a Form 8 check. This is the students first formal Air Force check ride and the AF Form 8 is filed in their Air Force Flight Evaluation Folder. This check ride verifies that the student can perform all forms of normal piloting, regardless of weather conditions.

Strike Flight Training's Instrument Rating check is essentially the same as SUPT's Navigation/Instrument Evaluation. SNAs are awarded a Standard Instrument Rating in accordance with OPNAVINST 3710.7P, which is filed in their NATOPS jackets for the remainder of their careers.[22] Unlike Air Force students, SNAs are authorized to fly in IFR conditions once they receive their Standard Instrument Rating. The Instrument Rating Stage is flown early in the Strike Flight Training, while SUPT's Navigation/Instrument Evaluation is flown much later in SUPT. Except in emergency conditions, Air Force students are not normally authorized to penetrate weather conditions, even after completing this check ride.

In the IFR/VFR Navigation subphase, Air Force students fly one night navigation sortie, which can be combined with a cross-country flight.[23] Also during this subphase, Air Force students fly one VFR two-ship formation sortie practicing enroute tactical formations.[24] Visual lookout, tactical maneuvering, and flight position are also instructed on this sortie. The Navy does not fly any of the Airways

Navigation sorties as formation or night sorties. The Airways Navigation Stage does have two check flights, each prior to the solo navigation flights.[25]

Fighter-Related Training

The majority of Air Force fighter-related training occurs in IFF and in a few subphases of SUPT. Strike Flight Training fighter related training occurs in Phase II (Modules 5, 7, and 8). Emphasis in section generally builds upon the experience from previous flight training. The fighter-related training in this section includes:

SUPT (Navigation Phase)[a]	Dual	Solo	Night	≥3-Ship
Low-Level Navigation	5	0	-	-
Low-Level Nav Evaluation	1	-	-	-
Two-Ship Low-Level Nav	4	0	-	0
IFF (A/B/C Tracks)[b]				
AHC	1/ 1/ 1	-	-	0
Basic Fighter Maneuvers	13/ 9/ 6	-	-	0
Surface Attack	-/ 4/ 4	-	-	4
Low Altitude Operations	-/ 1/ 3	-	-	0
TOTAL	24/25/24	0	0	4

Phase II[c]	Dual	Solo	Night	≥3-Plane
Operational Navigation	7	1	-	0
Weapons	4	4	-	8
Air-to-Air Gunnery	6	2	-	8
Out-of-Controlled Flight	1	0	-	0
Air Combat Maneuvering	7	6	-	4
TOTAL	25	13	0	20

[a]SUPT's T-38 fighter-related Navigation subphases. Source: U.S. Air Force, Specialized Undergraduate T-38 Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, May 1995), 46-47.
[b]IFF's fighter-related training Phases. Source: U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1994), 1-2, 5-21.
[c]Strike Flight Training's fighter-related training Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 161-165, 172-179, 204-211, 213, 215-227.

The comparative analysis of this subsection begins with SUPT's Navigation Phase, IFF's Low Altitude Phase, and the Operational Navigation Stage of Strike Flight Training. Both programs focus on training students to operate aircraft in the low altitude regime (down to 500 feet above ground level). Initial training is on low-level

routes flown between 300 and 420 knots. Later, formation and section training provide mutual visual lookout, course navigation, and low altitude awareness while flying various tactical formations. IFF students fly one low altitude formation sortie and conduct a simulated target attack on the low-level.[26] The Operational Navigation Stage conducts simulated low-level target attacks on seven sorties.[27] SUPT low altitude training includes ten training sorties (one evaluation flight, four formation sorties, and no solo sorties). IFF has up to three low altitude sorties (C Track--3, B Track--1).[28] Strike Flight Training's Operational Navigation Stage has eight training sorties (one solo and three section sorties[29]).

The most intense fighter training in the Advanced Phase is IFF's BFM Phase and Strike Flight Training's ACM Stage. IFF divides BFM into three modules: Offensive, four sorties; Defensive, four sorties; and High Aspect BFM, five sorties.[30] IFF B and C Track students fly less than these sorties, but receive the same type of training. Strike Flight Training ACM includes: Offensive, three sorties (one solo); Defensive, three sorties (one solo); and 2 Neutral one-v-one sorties (both solo). Strike Flight Training also includes one introductory warm-up sortie and four two-v-one sorties (two solo).[31]

Prior to beginning the BFM or ACM phase and stage, students fly a sortie that builds confidence in their abilities and in their aircraft. IFF flies an AHC as the first sortie of the program. This AHC sortie initiates students into the world of flying fighters. They fly the AT-38 inside the legal flight regimes that are not explored in SUPT. The Navy flies a similar event called the Out-Of-Controlled Flight (OCF). It is the first flown in the ACM module to prepare SNAs for some of the possible outcomes of ACM flight maneuvers.

BFM and ACM basics are instructed in the Offensive and Defensive phases. These procedures are essentially the same, just called different names. IFF one-v-one is also performed, but is included in the last sortie of each Offensive and Defensive module. High Aspect BFM or Neutral ACM is also essentially the same, including using the same terminology for one-circle and two-circle fights. The maneuvering skills in BFM and ACM are inter-related with almost all other aspects of a fighter pilot's mission, regardless if it is rejoining the formation, flying tactical formation, dropping ordnance, or engaged in aerial combat.

In addition to air-to-air training, most fighter pilots must also be able to deliver air-to-ground ordnance. IFF Surface Attack Phase has four sorties for ground attack fighter pilots, two conventional and two tactical sorties.[32] Strike Flight Training trains all SNAs in ground attack using eight sorties (four solo) in the Weapons Stage.

Surface Attack and Weapons focus on delivery procedures, range patterns, range procedures, formation responsibilities, and range safety. These phases introduce dive deliveries from ten-degree and thirty-degrees, including twenty-degrees for IFF students. Multi-ship and division operations conducted in this phase emphasize formation and range procedures. All four IFF Surface Attack sorties are scheduled as four-ships and Strike Flight Training has at least one dedicated sortie for division operations.

Differences in this section are more apparent than in the other subsections of this study. The Air Force provides no opportunity for solo training in SUPT Navigation Low-Level sub-phases or in IFF. On the other hand, Strike Flight Training allows SNAs the opportunity to fly thirteen solo sorties.

The BFM training flown in IFF varies depending upon the student's track. A Track students receive all thirteen of the BFM sorties at the expense of no Surface Attack and no Low Altitude sorties. B Track students receive all eight Offensive and Defensive BFM sorties and only one High Aspect BFM sortie. C Track students only receive three Offensive and three Defensive BFM sorties. IFF helps specialize Air Force students to better prepare them for their particular aircraft assignments. SNAs may or may not know what Fighter-Attack assignment they have, but all still proceed through the same ACM training.

Strike Flight Training's ACM also includes two-v-one training which is no longer performed in IFF. Not only does the Navy perform this in pilot training, but it is also a solo event. This type of training is delayed for Air Force pilots until FTU.

Another notable difference is between the IFF Surface Attack Phase and Strike Flight Training Weapons Stage. First, IFF Surface Attack has been reduced to only four sorties, two conventional and two tactical sorties. The Weapons Stage has eight conventional sorties, including four solo. IFF Surface Attack is only for those students in the B and C Tracks while all SNAs are required to complete the Weapons Stage.

Second, Surface Attack has two dedicated tactical weapons delivery sorties.[33] The Weapons Stage has no dedicated sorties for tactical weapons delivery procedures. Limited tactical procedures are instructed in the later portion of the Weapons Stage.

Third, the Weapons Stage continues to instruct rocket and strafe patterns and procedures. The current Surface Attack syllabus no longer includes rockets and strafe. Air Force air-to-ground fighter pilots must wait until FTU before they fly in the strafe pattern.

And fourth, there is a major difference in the evaluation of bombing procedures. Surface Attack students are only graded on the delivery procedures, not their weapons scores. Students are not required to qualify or achieve a certain percentage of their weapons hits to be within a particular criteria. Air Force fighter pilots will have to eventually qualify in FTU, but not in IFF. In contrast, SNAs must achieve programmed scores by certain flights or receive an unsatisfactory grade for that sortie. The grading criteria is not overly demanding, but does require some degree of concentration and skill for anyone hurling themselves at the ground for the first time. For the first four sorties, the average score must be at least between 125 to 225 feet.[34] The second four sorties must show some improvement in order to achieve an average of 100 to 200 feet.[35] These programmed, fixed requirements may be adjusted, if weather had extenuating circumstances for scores outside the grading criteria, by the Squadron Commanding Officer or if on a training detachment, by the Detachment Officer-in-Charge.[36]

The Gunnery Stage in Strike Flight Training has no Air Force equivalent. The Gunnery Stage prepares SNAs for aerial gunnery. SNAs train to use the T-45s aerial weaponry system to operate, track, and simulate firing at non-maneuvering to maneuvering "canned" targets. Flight and safety procedures are another important and demanding by-product of the Gunnery Stage. Air Force students practice aerial gunnery procedures in IFF, but this training is assimilated into the IFF Formation and BFM Phases. Gun camera debriefing is performed in IFF, as in Strike Flight Training, to instruct students on the proper procedures and techniques to track and "kill" a bandit. The Gunnery Stage allows SNAs to gain additional experience operating their aircraft against another aircraft in a fluid and dynamic environment.

Apart from SUPT's Low-Level Navigation Evaluation flight, no formal check rides are in this section of Air Force fighter training. There are no designated check rides in IFF. However, all sorties at the end of each IFF phase is an informal check flight. This is similar to the Navy's check flights prior to solo flights or at the end of most stages.

Carrier Qualification

The Carrier Qualification Stage is unique to the Fighter-Attack track. This stage is additional training that Air Force students do not require. The Carrier Qualification Stage is divided into two substages, one for each Phase of Strike Flight Training. The Carrier Qualification Stage sortie allocation from Table 6 is shown below:

Carrier Qualification[a]	Dual	Solo	Night
Phase I	1	8	0
Phase II	0	10	3
TOTAL	1	18	3

[a]Strike Flight Training's Carrier Qualification Stages. Source: U.S. Navy, T-45TS Strike Flight Training Curriculum (NAS Corpus Christi, Texas: Chief of Naval Air Training, 19 July 1995), 139, 228-229.

Phase I Carrier Qualification training is performed in Module 4 and is solely FCLP. In other words, it is shore-based training in preparation for landing aboard an aircraft carrier. Phase II also has FCLP sorties, nine of the ten sorties in that stage. The tenth sortie requires the SNA to accomplish ten aircraft carrier arrestments.[37] Ship-board operations are also conducted in this sortie.

Phase I has two check flights, the first and only dual FCLP sortie and the last solo FCLP sortie.[38] Phase II is flown entirely solo and also has two check flights.[39] The first is on the last FCLP sortie and the second is the actual carrier qualification sortie. These sorties are generally short, 0.6 hours apiece, but are among the SNAs most intense while in pilot training.[40] The final flight is quite

lengthy due to shipboard operations, the ten carrier arrestments, and flights to and from the ship. In addition to the large number of solo sorties flown in this stage, the SNA also flies three additional night sorties[41] bring his total to nine night sorties in the Fighter-Attack track.

Summary

Chapter 4 is a comparative analysis of the Fighter-Bomber and Fighter-Attack tracks of the Advanced Phase of Joint Pilot Training. Numerous similarities and differences were addressed in this chapter. Navy Strike Flight Training has more sorties that its Air Force undergraduate counterpart. When SUPT and IFF are added together, then the sortie count becomes fairly equivalent. Listed below is a general comparison of the two tracks:

Air Force		Dual	Solo	Night	2-Ship	≥3-Ship
SUPT		79	17	4	36	4
IFF		19	0	-	14	5
TOTAL	(115)	98	17	4	50	9

Navy		Dual	Solo	Night	2-Plane	≥3-Plane
Strike	(119)	78	41	9	46	25

Navy specific training, namely carrier qualification is a noted difference between the two training tracks. The additional Carrier Qualification Stages are the major difference in the number of solo sorties. Night training is a noted difference in the two systems. In addition, larger formations are flown more often in the Navy training system than in the Air Force training system, although initial multi-ship training is equally distributed between the services. The training emphasis may be in different areas, but the training accomplished by the Air Force and Navy is comparable. The comparative analysis presents raw data that will be evaluated in the next chapter, the evaluative analysis of the Advanced Phase of Joint Pilot Training.

Endnotes

[1]U.S. Air Force, T-37 Specialized Undergraduate Pilot Training (Randolph AFB, Texas: Headquarters 19th Air Force, April 1995), 1.

[2]Ibid.

[3]Ibid.

[4]Ibid.

[5]U.S. Navy, Primary Flight Training T-34C (NAS Corpus Christi, Texas: Chief of Naval Air Training, 4 January 1994), 8.

[6]U.S. Navy, Joint T-34C Intermediate Flight Training (NAS Corpus Christi, Texas: Chief of Naval Air Training, 13 Dec 1994), 9-10.

[7]Ibid., 11.

[8]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training, 1.

[9]U.S. Navy, T-45TS Strike Flight Training Curriculum, 6.

[10]U.S. Air Force, Introduction to Fighter Fundamentals (Randolph AFB, Texas: Headquarters 19th Air Force, October 1994), 1-3.

[11]Ibid., 1-2.

[12]U.S. Navy, T-45TS Strike Flight Training Curriculum, 5.

[13]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training, 32.

[14]U.S. Navy, T-45TS Strike Flight Training (NAS Corpus Christi, Texas: Chief of Naval Air Training, 10 July 1995), 86.

[15]Ibid., 31, 90.

[16]Ibid., 32-33.

[17]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training, 41.

[18]U.S. Air Force, Introduction to Fighter Fundamentals, 5-2.

[19]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training, 39.

[20]U.S. Air Force, Introduction to Fighter Fundamentals, 5-8.

[21]U.S. Navy, T-45TS Strike Flight Training, 89-90, 183-84.

[22]U.S. Navy, T-45TS Strike Flight Training Curriculum, 19.

[23]U.S. Air Force, Specialized Undergraduate T-38 Pilot Training, 45.

[24]Ibid.

[25]U.S. Navy, T-45TS Strike Flight Training, 88, 183.

[26]U.S. Air Force, Introduction to Fighter Fundamentals, 5-26.

[27]U.S. Navy, T-45TS Strike Flight Training, 162-165, 197-199.

[28]U.S. Air Force, Introduction to Fighter Fundamentals, 5-26.

[29]U.S. Navy, T-45TS Strike Flight Training, 197-199.

[30]U.S. Air Force, Introduction to Fighter Fundamentals, 5-9 to 5-20.

[31]U.S. Navy, T-45TS Strike Flight Training, 215, 224-227.

[32]U.S. Air Force, Introduction to Fighter Fundamentals, 5-22 to 5-25.

[33]Ibid., 5-24 to 5-25.

[34]U.S. Navy, T-45TS Strike Flight Training, 153.

[35]Ibid. [36]Ibid. [37]Ibid., 228. [38]Ibid., 139. [39]Ibid., 229.

[40]Ibid., 139, 229. [41]Ibid., 228.

CHAPTER 5

EVALUATION AND CONCLUSIONS

After completing the comparative analysis of the Fighter-Bomber and Fighter-Attack training tracks, this chapter evaluates the feasibility of consolidating the two tracks. The evaluation begins by addressing the research and supporting questions. After answering the supporting questions, the research question is answered. Finally, the chapter closes with the conclusions, recommendations, and areas for further study. First this chapter reviews the research question and the supporting questions and then the evaluation analysis begins.

Research Question

This thesis investigates the reason or reasons why there are two separate training tracks to graduate fighter pilots from Air Force and Navy pilot training programs. The research question for this thesis is: Can Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks be consolidated? If the answer is a conditional yes, what are the possible conditions or various levels of consolidation that may be feasible.

Supporting Questions

The research question has five supporting questions. First, What phase of joint pilot training implementation is the Air Force and Navy currently reviewing? Second, Is the training in the Fighter-Bomber and Fighter-Attack training tracks compatible for consolidation? Third, How would consolidation of the fighter tracks benefit each service?

Fourth, What barriers may have to be overcome to facilitate joint fighter pilot training? Finally the fifth question, Do the Air Force and Navy consider joint fighter pilot training compatible?
The remainder of this section addresses each supporting question individually.

1. What phase of Joint Pilot Training implementation is the Air Force and Navy currently reviewing? After conducting telephone interviews with different levels of Air Force and Navy staffs, the conclusion is that no research has been performed in this area. Continuing efforts are mainly in the Joint Primary Phase and in the other tracks or pipelines of the Advanced Phase. Numerous issues in the Joint Primary Phase are being addressed by all levels of the Air Force and Navy and are discussed later in this section.

The only fighter-related program under any consideration is in the Air Force. Staff officers in AETC have addressed the possibility of consolidating the training conducted in IFF into SUPT.[1] Before Air Training Command (ATC) became AETC in 1993, IFF was an Air Combat Command (ACC) FTU program at Holloman AFB, New Mexico. When AETC absorbed the IFF program, IFF moved to the current training locations at AETC bases. Now that AETC is responsible for all undergraduate and most all post-graduate fighter training (AETC is also responsible for F-15C and F-16C FTUs), there is the possibility of including IFF training in the latter phases of SUPT training for those students having fighter assignments. This would be similar to how the Navy conducts its training in Strike Flight Training.

2. Is the training in the Fighter-Bomber and Fighter-Attack training tracks compatible for consolidation? From the comparative analysis in chapter 4, it appears that, in general, the training in SUPT

and IFF is similar to the training in Strike Flight Training. This does not include the Carrier Qualification stages in Strike Flight Training.

Academic training is compatible. The Air Force has upgraded much of its academic courses with present technology to self-paced training with the aid of computer-aided instruction. The Navy's new T-45 Training System uses modern techniques in much the same manner.

Even though the simulator training conducted is similar, the methodology is not. The older Air Force T-38 simulator system, which is by no means outdated, does not provide the same services as the T-45 Training System. The OFT adds to and builds upon the experience SNAs can use in the aircraft. The T-45 Training System is more than just a trainer aircraft; it is a ground based system as well as an aircraft training system.[2]

The Navy has invested heavily in the T-45 Training System as has the Air Force in its continuous upgrades for their T-38 simulators. The OFT does provide additional training opportunities that will have to be addressed if the two fighter training tracks were to be consolidated. Otherwise, the generic simulator training in the Contact, Familiarization, Instrument, and Navigation phases and stages are compatible for consolidation.

The basics of flight training in the two fighter training tracks are comparable. However, there are differences in training philosophies and training requirements. The flight training instructed in most of SUPT is generally consistent with the flight training instructed in Phase I of Strike Flight Training. The Instrument and Navigation training is essentially the same, including sortie allocations (Air Force: Instrument--twelve, Navigation--eleven; Navy: Instrument--nine, Navigation--twelve). The Air Force SUPT Navigation

does not include the low-level training sorties (ten) which were included in the fighter specific training section of this study.

The most significant difference in the training philosophies is in the Contact, Familiarization, and Formation phases and stages. The Air Force concentrates more sorties up front to dedicated training in these phases than does the Navy (Air Force: Contact--twenty-eight, Formation--thirty-nine; Navy: Familiarization--seventeen, Formation--twenty-four). Air Force Formation for this section also includes the Tactical Formation phase flown in IFF. As stated in chapter 4, this does not mean the Navy emphasizes Familiarization and Formation any less than the Air Force. Strike Flight Training provides SNAs with many more section and division sortie opportunities in the later stages of training than their Air Force student pilot counterparts will receive. The difference in training philosophy is that the Air Force elects to dedicate more training sorties up front than in the later phases.

The training conducted in IFF is similar to Phase II of Strike Flight Training. This training builds upon the foundations learned in SUPT and in Phase I. All phases and stages of training have approximately the same quantity of training sorties with the exception of Surface Attack, Weapons, and Air-to-Air Gunnery. With SUPTs Low-Level Navigation subphases added to IFF, Air Force fighter-related training totals twenty-five sorties. Strike Flight Training's fighter-related training in Phase II totals thirty-eight sorties. The Weapons stage has an additional four sorties more than the Surface Attack phase. The Gunnery stage, eight sorties, has no Air Force equivalent. Inclusive in this Navy training is thirteen solo events in Phase II. The Air Force has none in its equivalent phases.

Sortie distribution is in the two training systems, as well as the training philosophy, are different, but not detrimental for

consolidation. With the exception of the Carrier Qualification stages and carrier landing patterns, the generic flight training conducted is similar. These two subjects are addressed in supporting question 3.

3. What barriers may have to be overcome to facilitate joint fighter pilot training? Many of the problems, training and/or institutional, that must be resolved in order to consolidate fighter training are being addressed in the Joint Primary Phase. Even though the Joint Primary Phase is operational, these problems are proving to be hurdles in the effort to facilitate greater cooperation and increased jointness. What may be appear to be trivial issues are not seen that way by the services. Therefore, the staffs and commands are routinely meeting together to work and hopefully solve or decrease these issues.

One of the most important flight related issues between the two services is visual signals. As noted in chapter 4, this difference has the potential to be a safety issue. Some visual signals have historical significance and probably would be contested if the services are forced to adapt a common visual signal system.[3] Students in Joint Primary Phase are learning the visual signals of the home training unit and have to relearn their service unique signals after returning back to their service for the Advanced Phase. This is not optimum. If safety issues were to be challenged and a joint pilot training program was the goal, then the services would most likely have to work together to develop a common visual signal system.

Another important issue is the institutional obstacle of instructing ship-board operations in flight training. This may be a Naval issue, but it will affect Air Force flight training if fighter training is to be consolidated. The AT/T-38 is not designed for carrier operations or for FCLP operations. In addition, practically all Air Force fighters, with the exception of the EF/F-111 and F-4 fighters,

require a flared landing. This institutional issue is and will be a major obstacle to consolidating the two fighter training systems.

Differences in cockpit instrumentation also exist, even for those with similar functions. One such instrument is the Angle-of-Attack (AOA) indexer. This device is a landing aid instrument to help pilots and naval aviators fly their aircraft at the proper approach speeds in the landing phase of flight. It has three symbols and three colors (slow, on speed, and fast) to aid cockpit scans and instrument cross-checks. Although the AOA indexer has a common function, it has a similar and yet a different means to present data. Figure 2 is a simplified diagram of the two AOA indexers.

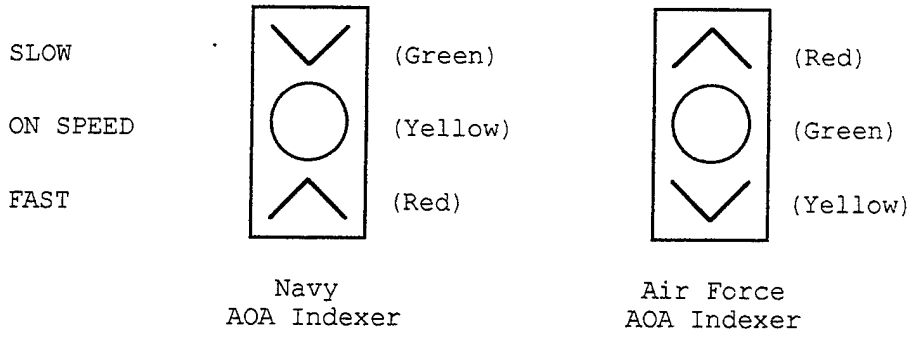

Figure 2. Angle-of-Attack Indexers

This difference is not major, but once again indicates another philosophical difference.[4]

Terminology is a minor stumbling block in the Primary Phase as it is in the Advanced Phase of Joint Pilot Training. Those service unique terms presented in the Formation section can be easily worked around. Other examples of common terms and phrases are found in Appendix B. Depending on service orientation, even a common term, such as "aspect angle" used in BFM and ACM, has different meanings. Aspect angle in the Air Force is a friendly fighter's angular position in

relation to the tail of a bandit aircraft, i.e., a friendly approaching a bandit aircraft head on has an aspect angle of 180 degrees. Aspect angle in the Navy is measured off the nose of the bandit aircraft, i.e., the same situation as above would produce an aspect angle of 0 degrees.[5] In this instance, both aspect angles produce a situation with neither aircraft initially in an offensive or defensive position.

Other differences in training and philosophies include check ride verse check flight, grading criteria, student flow, and student grade books. These Joint Primary Phase issues are currently being worked by the various staffs. The check ride and check flight positions were discussed in chapter 4. The Air Force position is that check rides are evaluation flights and are simply pass or fail. The Navy allows the evaluation IP to offer instruction, as required, in order that the SNA perform the required tasks in a satisfactory manner.

The grading criteria is another philosophical issue. The Air Force uses an absolute grading criteria. This is due to limited number of instructors a student pilot may initially fly with during a phase of training. Grading in this method is very comprehensive. The Navy limits the number of IPs a SNA can initially fly with, but not like the Air Force, which means they must use a relative grading scale.[6]

The student flow through a course of training is another issue between the Air Force and the Navy. Student pilots begin training in the Air Force as a class, progress through training as a class, and then graduate as a class. Some students will progress faster than others while some will lag behind the others, but all will remain within a week of the programmed training schedule, except when unforeseen circumstances are involved. If a student falls behind significantly due to illness, personal reasons, or others, the student may either be disenrolled or placed in the following class. Waivers for late course

completion must be submitted and approved by Headquarters 19th Air Force.

The training flow is different in the Navy. SNAs enter training in the same class, progress through academics at the same rate, but may graduate at various times depending on proficiency levels or for other reasons. Once the bulk of academic training is accomplished, SNAs that started training together may be strung out through various stages. SNAs then progress through training at different rates depending upon weather, proficiency, and other reasons and usually graduate at various times. The Navy claims that this is a quicker and more efficient system than the Air Force class system. The Air Force claims the contrary.[7] Air Force training systems are time oriented which allows for accurate forecasting of training needs and availability's. The Air Force feels that the current Navy system does not provide detailed forecasting of training allocations. This at times leaves some students in a casual status while waiting for a training slot to become available, which is not an efficient means of scheduling training.

Finally, the last Joint Primary Phase issue this study will address is the administration of the grade books or training jackets. This may not seem like an issue, but it is. Both services have been using their associated grading system for quite some time and do not feel inclined to change. The Air Force students grade book contains his computerized grade sheets from academic, simulator, and flight training, including check ride performance. There is a section for hand written comments when circumstances warrant; failed rides, waivers, or any other issues that may reflect upon the student's training performance. Air Force students can graduate with little or no additional paperwork in their gradebooks in contrast to those with much documentation. Navy training jackets maintain much of the same information; however, the

grade sheets are not computer generated. They are marked by hand and when required, include additional comments.[8] It can be said in both services: students do not graduate, their documentation does.

As noted, several barriers and obstacles exist that may impede fighter training consolidation. Some of these have developed during the Joint Primary Phase and are being staffed by the services. Others are known to exist but do not directly relate to the Joint Primary Phase. These issues can only be dealt with after the Joint Primary Phase issues are resolved. Therefore, the issues presented in this study will delay and possibly hinder any possibility to consolidate the two fighter training systems.

4. Would consolidation of the fighter tracks benefit each service? With a premise that training in the Fighter-Bomber and Fighter-Attack tracks could be consolidated, then both services' staff agencies agreed that the services could benefit from future consolidation of those tracks. Any effort to further develop joint cooperation and teamwork is for the good of all military services. However, the costs of consolidation would most likely outweigh the benefits of additional joint training, at least in the short term. The overriding factor would be the need for a common Advanced Phase trainer aircraft, in essence, an Advanced Phase version of the JPATS. The prime driver for this requirement is the Carrier Qualification stages.

The culmination of Strike Flight Training is Phase II's Carrier Qualification stage. The other stages of Strike Flight Training are important, but if an SNA cannot qualify at the ship, then the SNA will not graduate from training. To prepare SNAs for this stage and to give them the best training possible, the Navy requires all SNAs to fly a minimum of eighty hours in the qualifying aircraft prior to "seeing the back of the boat."[9] Therefore, the Advanced Phase will require a single

aircraft or the cost of training SNAs will be disportionately more than training their Air Force counterparts.

A transition to a JPATS similar aircraft in the Advanced Phase will not be an easy one. The Air Force is investing to upgrade the T-38 to the Talon-2000, which will provide a technologically advanced aircraft for both SUPT and IFF training.[10] The Navy is still in the process of converting its Advanced Phase training fleet to the T-45A. With the drawdown and budgetary reductions, the procurement is progressing at a much slower rate than the Navy desires.[11] Due to sunk and research and development expenditures, neither service will be enthusiastic about converting to a new Advanced Phase trainer aircraft.

The fundamental constraint for a joint Advanced Phase trainer aircraft is that it must be aircraft carrier capable. If not, then some or all SNAs will have to fly two different aircraft in the Advance Phase, which defeats the Navy's current transition to the T-45. Procuring an aircraft that is capable of operating on land and on aircraft carriers produces some side effects. First and probably most important today is cost. The carrier environment is not a friendly one. Maintenance costs increase as do operational costs. A carrier capable aircraft must have reinforced main landing gear, wing structures, aft-sections (for the tail hook), a heavier nose gear (for catapult launches), and avionics that can withstand the stress of carrier landings, arrestments, and catapults.[12] This increases the gross weight of the aircraft, thereby decreasing performance and increasing fuel consumption.

Neither of these is favorable to the Air Force, which means that an Air Force version of the present T-45 is unlikely. In addition, according to the 1989 DOD Trainer Aircraft Master Plan, the cost of "'Demodification' is at least as expensive as the initial modification

when one attempts to work from the same production line after initial production of the Navy version has begun."[13] In other words, one must choose between performance or modification when deciding for a joint service fighter trainer. Any present long term benefits do not outweigh the near term costs of consolidating the two training systems.

5. Do the Air Force and Navy consider joint fighter pilot training compatible? At this time, the answer is no. The above issues in the Joint Primary Phase are still unanswered. In order to consolidate any fighter training, various levels of commands will have to be satisfied, from 19th Air Force and CNATRA to the Air Staff and Chief of Naval Operations staff. Inclusive in this is the numerous Major Commands in the field and fleet, who are the recipients of the training products, and the service Chiefs.[14]

Joint Pilot Training is a political touchy environment for both services. Neither service wants to be subjugated to the other and any service position bargained away for increased jointness is seen as a defeat for either service. This is why the on going joint service meetings are continuing to work on issues in the Joint Primary Phase that probably should have or could have been decided upon in 1993 or 1994. There is some give or take being performed at the different levels but will require four star intervention just to answer the issues at the Primary Phase, much less for any notion to consolidate the Advanced Phase's Fighter-Bomber and Fighter-Attack training tracks.[15]

Conclusions

Can the Air Force Fighter-Bomber and Navy Fighter-Attack pilot training tracks be consolidated? Consolidation is possible, but not all training is readily capable for consolidated into a single program. Currently there is too great a disparity in some areas of training, notably solo time, night time, and sortie distribution in formation

training, that must be resolved prior to a consolidated fighter training track. This does not preclude the consolidation of similar fighter training like basic flight training in the current Joint Primary Phase.

In addition, the Carrier Qualification stages for SNAs are, and always will be required in the Advanced Phase. This requirement alone requires that a "Joint Advanced Phase" trainer aircraft is paramount. As addressed in the fourth supporting question, the required eighty hours of aircraft time is a critical necessity.

The near-term objective of consolidating Fighter-Bomber and Fighter-Attack training is pessimistic at best. Air Force students could be trained in a Strike Flight Training similar syllabus. However, they would have to be retrained as they re-entered the Air Force training system (landings, visual signals, altitude chamber, etc.)[16] SNAs would have to remain in the Naval training system due to the required carrier training unless the Air Force purchased T-45 trainers.

If the Air Force did purchase Naval trainers for joint fighter training, the training bases would have to transition to or supplement the current Visual Approach Slope Indicator (VASI) or Precision Approach Path Indicator (PAPI) with the Fresnel Lens Optical Landing System (FLOLS). The VASI and PAPI system is the standard landing aid at most all Air Force and civilian airfields. The FLOLS is the standard landing aid at most all naval installations and on all aircraft carriers. Also the Air Force will have to add additional runway lighting to simulate a carrier landing deck for night FCLP and night landings. This further cost is unlikely with the present budget constraints.

Long-term consolidation is more feasible. The above training and operational considerations could be staffed and forecasted in future budgetary cycles. Additional time to address the issues in the Joint Primary Phase could occur and staffs could begin to lay the foundation

for a Joint Advanced Phase training system and aircraft. The problems that the Joint Primary Phase has uncovered will be the corner piece for any additional flight training consolidation. However, planning considerations for joint fighter training must begin soon in order to lead turn any possible Congressional or DOD recommendations or requirements to consolidate the two fighter training tracks. This would be a lesson learned from consolidating the Air Force and Navy Primary Phases.

Once a common syllabus is developed for the Joint Primary Phase when the JPATS aircraft is operational and after the present Joint Primary Phase issues addressed are resolved, then a "Joint Advanced Phase" is feasible. Until then, the two fighter training tracks will remain service unique training tracks.

Recommendations

Once the issues in the Joint Primary Phase have been satisfactorily solved for both services, consolidating the Fighter-Bomber and Fighter-Attack tracks is feasible. A carrier qualified trainer aircraft that is also a bombing, strafing, and BFM and ACM platform is required. Due to the similarities of the initial training in SUPT and Strike Flight Training, the initial phases and stages of training could be consolidated into a core Phase I training block. Training during Phase I could consist of the basic Contact and Familiarization, Instrument, Formation, and night training.

After this phase of training, Air Force Fighter-Bomber students would probably have to be selected to fly a fighter specific training track or a bomber track. The Bomber track in this phase would include all the fighter specific training except for BFM and ACM sorties. Air Force fighter designated students could then continue fighter specific training with their SNA Fighter-Attack counterparts. SNAs would

complete this training, Carrier Qualification Phase I (FCLPs), and then proceed with the remainder of the Advanced Phase training track.

At this point, instruction in the fighter related training tracks could have at least two alternatives. First, the training could be based on an "universally assignable" fighter pilot. This is similar to the current Strike Fighter Training program. With this alternative, student aircraft assignments are not required until late in training. After accomplishing the designated or required training, Air Force students graduate from undergraduate pilot training and proceed to their FTUs. SNAs would also complete this similar type Strike Flight Training Phase II training, enter the second Carrier Qualification stage, accomplish their ten carrier arrestments, and then graduate as Naval Aviators. Naval Aviator training would still remain longer training than their Air Force equivalent, but this is inevitable due to Carrier Qualification.

Another alternative is to select students based on personal preference, IP recommendations, and class rankings for training in specialized training tracks, similar to the present IFF program. The Phase I core training could be expanded to include some low-altitude training sorties. The remainder of Phase I training would be the same as stated previously.

Phase II training tracks would resemble those in IFF. Four or more type tracks could be developed for the pure air-to-air fighters (F-15C, F-14D), the pure air-to-ground fighters (F-117, A/OA-10), the dual role fighters (F-15E, F-16C, F/A-18), and possibly the tactical air support aircraft (EF-111A, EA-6B, S-3B). Air Force students would complete the programmed training tracks, graduate, and proceed to their FTUs. SNAs would complete the same programmed training tracks, accomplish the required FCLPs and carrier arrrestments per Strike Flight

Training's current guidance, and then graduate as Naval Aviators. Again, SNA training is longer that Air Force student training.

Students would have to be selected early in training, after the completion of Phase I, for one of these tracks. This would also mean that the students, both Air Force and Navy, are pre-selected for their follow-on type aircraft and mission. In addition, FTU and FRS training quotas and dates as well as field and fleet requirements would have to be accurately forecasted for this type of a pilot training system. Graduation dates would also have to be closely monitored to ensure that FTU and FRS training quotas are adequately filled. This should not be much of an issue since the current pilot training programs are designed to meet the field and fleets personnel needs. Additional coordination between the services would also be required in this alternative to ensure that student entry and graduate coincide with FTU and FRS training dates.

Another issue for either alternative, as is with the current Strike Flight Training program, is focusing Carrier Qualification Phase II training around the fleet's scheduled aircraft carrier availability. Unforeseen changes in the Carrier Qualification Phase II could disrupt the normal course flow for either alternative, as it does sometimes in Strike Flight Training. This situation is and would be unfortunate, but is one that must simply be handled.

These two alternatives are examples of how fighter training could be consolidated in the future. Either system is feasible if a Joint Advanced Phase trainer aircraft is procured. Consolidated fighter training is possible, but will require high level leadership decisions and implementation.

Recommended Areas for Future Research

There are three recommended areas for future research. First, What are the aircraft design requirements for a "Joint Advanced Phase Fighter-Type Trainer." Possible research would investigate areas of fleet modernization, modification, development, procurement, and service cost for a new or purchasing an off the shelf trainer. Second, What are the training requirements for a "Joint Advanced Phase Fighter-Type Program." This investigates the forecasted training needs and requirements of the services for future fighter pilots. Third, What would the services desire for quality of fighter pilot training in the undergraduate pilot training system, a universally trained fighter pilot or a specialized trained fighter pilot. This would address the type of Advanced Phase fighter training program and possible syllabus.

Summary

Chapter 5 addressed the five supporting questions using an evaluative analysis of the two fighter training tracks. The conclusions to the research question are two-fold. First, near-term consolidation is unlikely. Second, long-term consolidation is feasible, but requires the Air Force and Navy to investigate possible courses of consolidation now, not later. This should reduce the type and number of hurdles in transiting to a consolidated joint fighter training program. Otherwise, when the services are told to consolidate their fighter training, they will be in the same predicament as they are in the Joint Primary Phase. The recommendations and areas for further research highlight the need to be proactive in the issue. Consolidation of the fighter training tracks is feasible, but only if both services want to consolidate or when forced to consolidate.

Endnotes

[1]John Fleecy, Major, U.S. Air Force, AETC/XOT (Joint Pilot Training Staff Officer), Randolph AFB, Texas, Telephone Interview by author, 13 February 1996.

[2]"Major Upgrades Improve Navy Ground School," Aviation Week & Space Technology, 22 August 1994, 47.

[3]The Navy visual prepatory landing gear signal is a circular motion of the hand and followed by the execution signal of the hand at the top of the circle being dropped to the bottom of the circle. This dates back to early years of carrier aviation when the first U.S. Navy carrier aircraft fitted with retractable landing gear, i.e., the Grumman F-4F Wildcat, raised and lowered the landing gear with a hand crank in the cockpit.

[4]Personal experience by the author from having flown in Air Force (F-111 and AT/T-38) and Navy (A-6E/KA-6D) aircraft equipped with AOA indexers. After realizing and accepting the difference it can be dealt with, but at times in a stressful environment, a 1000 hours of experience in one system can sometimes be a hindrance in another.

[5]Frankenberger, Lieutenant, U.S. Navy, CNATRA (Strike Pilot Training Officer), NAS Corpus Christ, Texas, Telephone Interview by author, 16 February 1996.

[6]Fleecy.

[7]Ibid.

[8]Bill Edwards, Commander, U.S. Navy, 19AF/DOTI (Joint Pilot Training Staff Officer), Randolph AFB, Texas, Telephone Interview, 15 February 1996.

[9]Donovan, Commander (Captain Select), U.S. Navy, CNO/889J6 (Joint Pilot Training Office), Navy Pentagon, Washington, D.C., Telephone Interview, 17 February 1996.

[10]Rick Falkenheim, Major, U.S. Air Force, AF/XOOT (Air Staff Pilot Training Officer), Air Force Pentagon, Washington, D.C., Telephone Interview, 15 February 1996.

[11]Donovan.

[12]Department of Defense, Department of Defense 1989 Trainer Aircraft Masterplan (Washington, D.C.: U.S. Government Printing Office, February 1989), 4-6.

[13]Ibid.

[14]Edwards.

[15]Frankenberger.

[16]Fleece.

GLOSSARY

Advanced Strike Training. The final phase of undergraduate flight training for SNAs in the older Advanced Phase of Navy Fighter-Attack pilot training. This training is accomplished in the TA-4J.

Aerial Gunnery Stage. Navy stage of training that instructs SNAs in the procedures and techniques for operating their aircraft and associated weapon system against another training aid aircraft while maintaining formation integrity and safety.

Air Education and Training Command (AETC). The Major Command (MAJCOM) in the United States Air Force responsible for pilot and navigator training and qualification programs. AETC headquarters is located at Randolph AFB, Texas.

Air Combat Maneuvering (ACM). Air-to-air combat training performed from an offensive advantage, a defensive disadvantage, or a neutral position. The Air Force does not conduct ACM training until follow-on training at FTUs and ACM is flown as two aircraft vs. one bandit aircraft. The Navy conducts ACM training in the later stages of the Fighter-Attack track. The Navy considers all air-to-air training as ACM, whether it is flown as a one-v-one or a two-v-one.

Aircraft Carrier Qualification Stage. Navy stage to prepare SNAs for carrier operations and their follow-on fleet assignments. Usually conducted in two phases. First, FCLP touch-and-go landings are performed to a satisfactory level at an airfield. When SNAs are considered qualified to go to the ship, they accomplish the required number of touch-and-go landings and arrested landings aboard an aircraft carrier.

Air Force Pilot. An Air Force officer who graduates from either Undergraduate Pilot Training or Specialized Undergraduate Pilot Training earning the Air Force pilot's "Silver Wings."

Airways Navigation Stage. Navy stage of training geared to instruct students how to plan, to file a flight plan, and to navigate in the U.S. Federal Aviation Airways System.

Basic Fighter Maneuvers (BFM). Air Force term for the IFF phase of air-to-air combat training. Air Force instruction on BFM is conducted with one aircraft vs. one aircraft in the offensive and defensive roles or from a neutral position. In the Air Force, proficiency in BFM must be obtained prior to learning ACM, i.e., they are considered as two separate and distinct phases.

Basic Instrument Stage. Navy stage of training instructing aircraft operation in non-visual conditions, i.e., flying through clouds

or fog, or whenever the aviator cannot determine level flight conditions by using outside references.

Chief of Naval Air Training Command (CNATRA). The Command in the United States Navy responsible for Naval Aviator and Naval Flight Officer training and qualification programs. CNATRA headquarters is located at NAS Corpus Christi, Texas.

Contact Phase. The introductory phase of Air Force flight training in each type of aircraft. This phase emphasizes take-off and landing procedures and characteristics, aircraft handling characteristics, emergency procedures, acrobatics, and general airmanship.

Familiarization Stage. The introductory stage of Navy flight training in each type of aircraft. This stage is essentially the same as the Contact Phase in Air Force flight training.

Formation Phase/Stage. Air Force phase and Navy stage of training instructing students aircraft operation in close proximity to another aircraft. Formation training also includes the ability to navigate and to lead another aircraft through various maneuvers. Formation training is generally conducted with only two aircraft, but training will progress to flights of three and four aircraft.

Instrument Phase. Air Force phase of training emphasizing non-visual flight procedures and operating an aircraft from take-off to landing in those conditions. This Air Force phase combines the training in the Navy's Basic Instrument and Radio Instrument stages into one phase.

Intermediate Strike Training. The phase of training that introduces SNAs to naval tactical jet aviation in the T-2C. This phase of training is also in the older Navy Advanced Phase of pilot training.

Joint. "A term that connotes activities, operations, organizations, etc., in which elements of more than one military department of the same nation participate." (Joint Pub 1-02)

Joint Pilot Training. A joint program that the military services and the Coast Guard use to train future pilots and Naval Aviators. After screening, if required, students enter the Joint Primary Phase. Upon completion of this phase, students then transition to one of four Advanced Phase pipelines or tracks: Air Force Fighter-Bomber, Navy Fighter-Attack, Airlift-Tanker-Maritime Patrol, and Helicopter. After earning their wings, pilots and Naval Aviators will then proceed to their operational assignments in the field or fleet.

Low Level Navigation Phase. Air Force IFF phase that instructs future fighter pilots to operate tactically at low altitude (down to five hundred feet above ground level) while in formation with another aircraft.

Naval Aviator. A Naval or Marine officer who graduates from a Navy pilot training program earning the Navy pilot's "Wings of Gold."

Navigation Phase. Air Force phase that instructs aircraft operation in visual flight conditions for navigating from point A to point B.

This phase also includes basic single-ship low level aircraft operation and navigation.

Out-of-Control Flight Stage (OCF). Navy stage to familiarize SNAs with aircraft departure from controlled flight procedures and follow-on recovery procedures. Generally associated with flights preceding the ACM and/or Aerial Gunnery stages.

Operational Navigation. Navy stage that instructs low level operations and procedures. Similar to the Air Force IFF Low Level Navigation phase.

Radio Instrument Stage. Navy stage that emphasizes procedures to operate an aircraft in non-visual flight conditions for take-off, approaches, and landings.

Specialized Undergraduate Pilot Training (SUPT). The new Air Force undergraduate pilot training program. It consists of prescreening in the T-3A, Joint Primary Training in the T-37B or T-34C, and then specialized training in either the Fighter-Bomber track flying T-38As or the Tanker-Transport track flying the new T-1A. Those students selected for C-130 follow-on training continue flight training as NAS Corpus Christi, Texas in the T-44.

Strike Flight Training. The new training curriculum in the Navy Advance Phase of Joint Pilot Training. Strike Flight Training combines the Intermediate and Advanced Strike Flight Training into one program and one aircraft, the T-45A.

Surface Attack Phase. Air Force IFF phase instructing basic weapon delivery procedures and techniques. This phase is similar to the Navy's Weapons stage, except the Air Force no longer instructs strafing. It also includes twenty degree dive bomb deliveries.

Undergraduate Flying Training (UFT). The Air Force training program that includes the new Specialized Undergraduate Pilot Training and Specialized Undergraduate Navigator Training (SUNT).

Undergraduate Pilot Training (UPT). The former Air Force pilot training program which graduates universally assignable pilots. UPT consists of prescreening (T-3A), Primary Jet Training Phase (T-37B), and Advanced Jet Training (T-38A).

Weapons Stage. Navy stage of training instructing SNAs in the procedures and techniques to bomb and strafe ground targets. Bombing is performed from the conventional and tactical patterns; ten and thirty degree dive angles. Strafing is also performed from the conventional and tactical patterns; low dive angles.

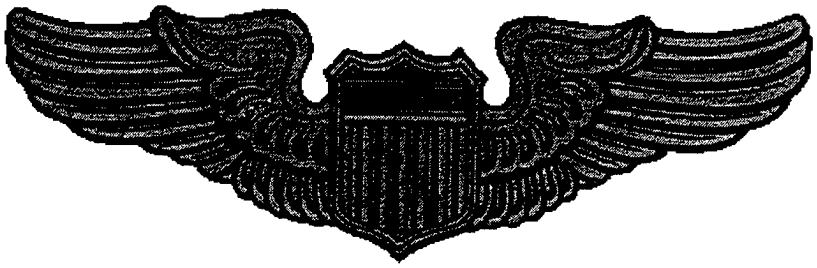

Fig. 3. Illustration of Air Force Pilot Wings. Photograph from author's personal collection.

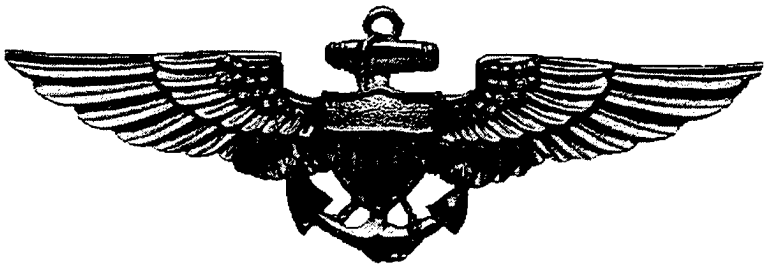

Fig. 4. Illustration of Naval Aviator Wings. Photograph from author's personal collection.

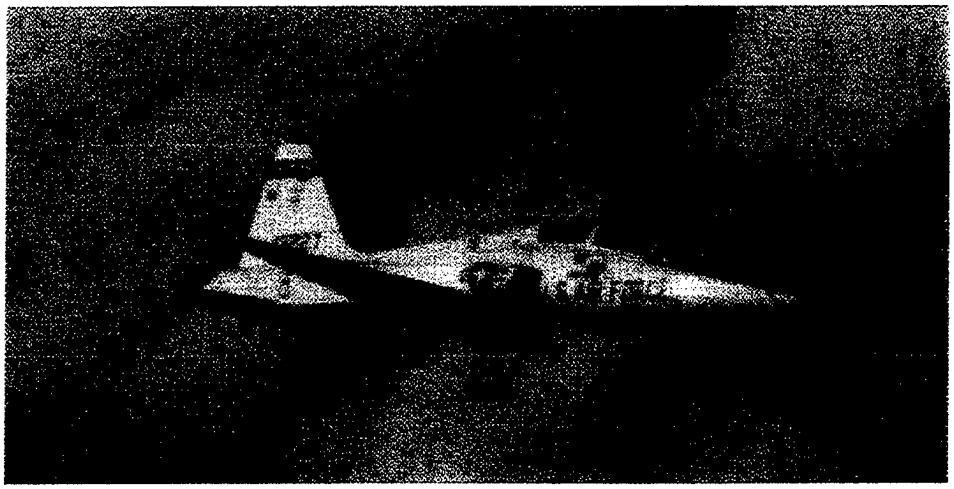

Fig. 4. T-38A Talon flown in SUPT and UPT. Photograph from author's personal collection.

Fig. 5. Flight of two AT-38B Talons flown in IFF. Photograph from author's personal collection.

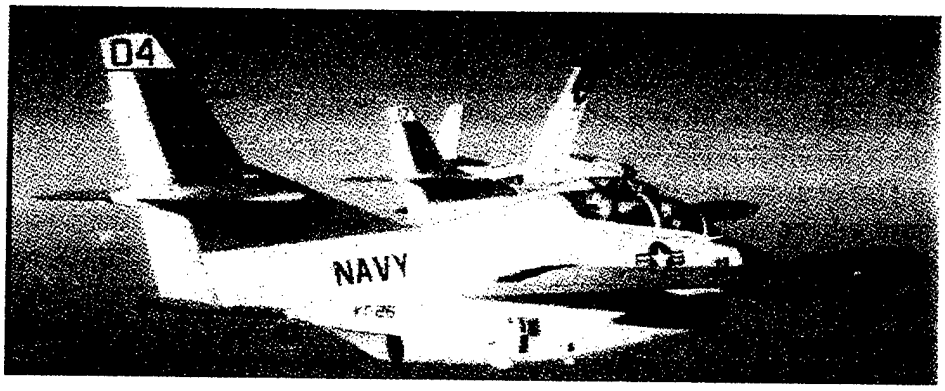

Fig. 7. Division of three T-2C Buckeyes flown in Intermediate Strike Flight Training. Photograph from Training Squadron TWENTY-SIX, reprinted, by permission of the editor, "VT-26 Carrier Qualifications," The Hook vol. 19, no. 2 (Summer 1991): 103.

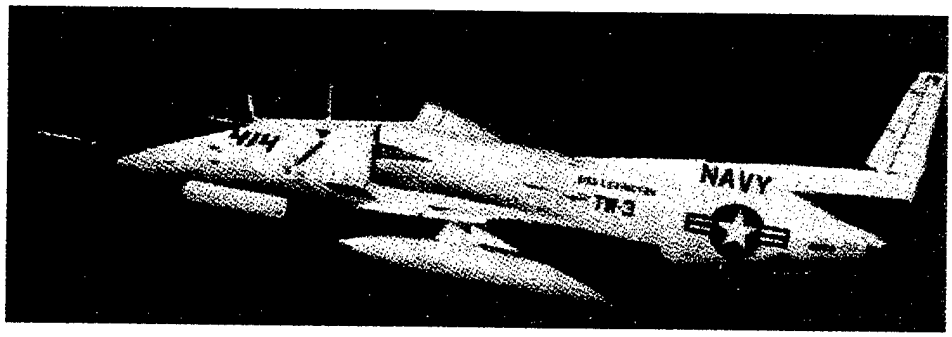

Fig. 8. TA-4J Skyhawk flown in Advanced Strike Flight Training. Photograph by Tony Cassanova, reprinted, by permission of the editor, "Vulture's Row," The Hook vol. 19, no. 1 (Spring 1991): 92.

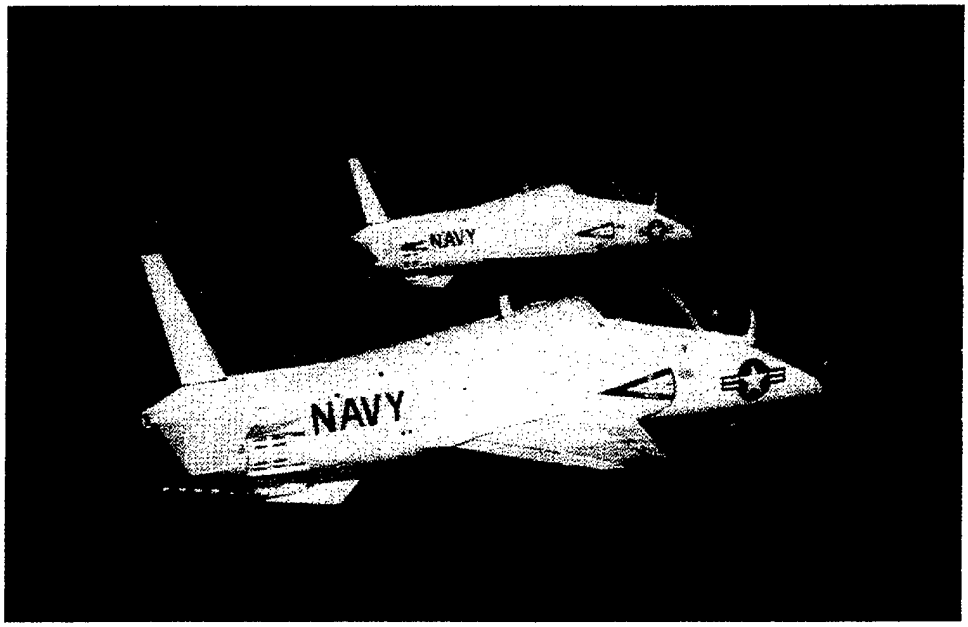

Fig. 9. Section of T-45A Goshawks flown in Strike Flight Training. Photograph by Bob Lawson, reprinted from D. M. Murtha, "First Students Enter T-45 Training System," Naval Aviation News vol. 76, no. 6 (September-October 1994), 16.

APPENDIX A

EXAMPLE OF STAFF QUESTIONNAIRE

Service:_____ Office:_____ Name/Phone/Date:_____

1. Is there a study or research being conducted to combine the Fighter-Bomber and Fighter-Attack tracks of the Advanced Phase of Joint Pilot Training? If so, what?

2. Is consolidated undergraduate fighter pilot training desirable? Why or why not?

3. How could the services benefit if the two fighter training tracks were consolidated?

4. How is the training in the two fighter training tracks similar?

5. Besides Carrier Qualification, what other differences in the two fighter tracks exist?

6. Is it feasible to consolidate any of the training in the Fighter-Bomber and Fighter-Attack tracks?

If so, what type(s) of training could be feasible to consolidate?

7. What kind of obstacles would have to be overcome in order to consolidate the two fighter training tracks?

8. Are there service related barriers to consolidating the two fighter training tracks?

If so, are there differences in institutional, operational, and training philosophies, etc.? (Command and control, decision making in regards to regulation vs. instruction, IP training, checkride philosophy, grading criteria, landing pattern, student flow, etc.)

APPENDIX B

EXAMPLES OF COMPARABLE TERMS

Phrase	Term	
	Air Force	Navy
Failed to meet standards	Bust	Down
Primary runway in use	Active	Duty
Left	Left	Port
Right	Right	Starboard
Full power (non-afterburner)	Military Power (Mil Power)	Military Rated Thrust (MRT)
Aerial decision making	Judgment	Headwork
Three feet wingtip clearance	Fingertip	Parade
Ten feet to "many" ship-widths clearance	Route	Cruise
Position below and directly aft of lead aircraft (similar to aerial refueling)	Close Trail	Column
Reform the formation after aircraft separation	Rejoin	Rendezvous
Formation of 2 aircraft	Flight	Section
Formation of 3 or more aircraft	Multi-ship	Division
Angular position in relation to bandit aircraft	Aspect Angle (tail)	Aspect Angle (nose)
Loop, aileron roll, split-S, etc.	Aerobatics	Acrobatics
Non-full stop landings	Touch-and-go	Bounce
Medically not cleared to fly	Duty to Not Include Flying (DNIF)	Down Chit
Medically cleared to fly	Off DNIF	Up Chit

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